

# FACILITATING REGIONAL COOPERATION THROUGH DEVELOPMENT OF CONSERVATION CORRIDORS IN THE KHANGCHENDZONGA LANDSCAPE

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## ABSTRACT

The Hindu Kush-Himalayan (HKH) region, with elements of four of the world's '34 Biodiversity Hotspots' is a significant reservoir of rich biodiversity that hosts many globally significant transboundary landscapes, each with extraordinarily varied ecosystems, unique species assemblages and rich genetic diversity. It is also home to millions of poor and marginalized communities who strongly depend on the rich biodiversity for their subsistence livelihoods. Until 2007, the regional member countries of the HKH have established 488 protected areas covering 39% of their richer land for conservation objectives (Chettri et al, 2008). Many of these protected areas are small, scattered and isolated without the connectivity necessary for larger mammals using these protected areas as their habitat range. Considerable number of these protected areas are transboundary in nature expanding contiguously to two or more countries. However, the conservation measures including the issues and policy perspectives differ with countries. To address such differences the global communities are advocating ecosystem/landscape approaches in conservation seeking cooperation among the countries sharing such complexes. Realising the pressing conservation challenge of balancing the environmental preservation and the needs of the people, the International Centre for Integrated Mountain Development (ICIMOD) initiated the 'transboundary biodiversity management' in the southern half of Khangchendzonga Landscape (KL) that spreads across parts of Bhutan, India and Nepal. The KL conservation initiative was inspired from the directives of the seventh Conference of Parties to the Convention on Biological Diversity (CBD) that recommended the 'Ecosystem Approach' to biodiversity conservation, advocating the use of participatory community-based resource management, environment protection across larger landscapes and promotion of regional and international cooperation. Building on to the existing but 'inadequate' conservation measures of protected areas system in the KL, ICIMOD advocated 'conservation corridor' model that linked 'isolated' protected areas with the surrounding habitats, promoting the establishment of contiguous landscapes while allowing human activities on sustainable basis. Realising regional cooperation as a key to achieving environmental and economic sustainability among the countries sharing this complex, ICIMOD and its partners developed a 'Regional Cooperation Framework' to customize global CBD agenda to a regional level harmonising national policies and legislation towards effective management of this transboundary complex. The framework while serving as a foundation towards building the regional cooperation also paved way to facilitating the landscape level conservation in the KL. This article shares the strategic process involved in developing the conservation corridors in the landscape and points towards the need for further regional cooperation in bringing effective biodiversity management in the HKH region as a whole.

**KEYWORDS:** *conservation, landscape approach, ecosystem management, corridors, regional cooperation, Hindu Kush- Himalayan region*



Mount Khangchendzonga range

## INTRODUCTION

**T**he Hindu Kush-Himalayas (HKH) region covers an area of 4.3 million square kilometres (sq km), is home to 150 million people, and sustains a total population of 1.5 billion living in the associated river basins. The biological significance of this region is evident from the fact that it hosts two of the ten-mega-biodiversity centres of the world (Mittermeier et al. 1997) and parts of the four biodiversity hotspots (Mittermeier et al. 2004). Moreover, 39% of the HKH has been designated as protected area (PA), containing important biodiversity and habitats (Chettri et al. 2007). Although designated protected areas have increased in number over the years, many of these protected areas have not adequately translated their conservation intentions into ground realities. In addition, protected areas are managed as isolated islands without considering animal movement across the landscape for their long term survival and maintenance of necessary genetic traits (Chettri et al 2007). Wilderness found in the transboundary areas are also subject to higher level of threats, mainly from over extraction of resources, illegal trade, limited livelihood options and policy differences among the countries (Sharma et al. 2007). In addition, communities in and around candidate complexes are subjected to



The dense vegetation of the Singalila National Park in West Bengal that connects to Barsey Sanctuary in Sikkim

intense economic, physical and social vulnerabilities. It is a paradox that while the region is biologically and culturally rich, majority of its peoples, are abysmally poor (Ives et al. 2004). ICIMOD with its partners are trying to address the push and pull issues of conservation and development through a landscape approach to biodiversity management; the approach involves communities in conservation planning, and seeks their economic gain in the conservation efforts. It also allows participation of wide range of stakeholders. In the Khangchendzonga landscape (KL hereafter), the concept of connectivity and conservation corridor linking protected areas in the landscape, covering three countries namely India, Bhutan, and Nepal (Sharma and Chettri 2005; Chettri et al. 2007) has been attempted.



Mt Sinoulchu as seen from Zemu Glacier

Conservation is one of the numerous issues that involve cooperation at various levels of resource management. Many of the past experiences have showed that conservation of biodiversity requires a comprehensive and multi-scaled approach that also considers socio-cultural and economic aspect. Protected area management has been vital for both biodiversity conservation and sustainable development. They are key to the achievement of many of the Millennium Development Goals, particularly those relating to environmental sustainability and poverty alleviation and contribution towards 2010 targets of World Summit on Sustainable Development (WSSD), which aim to significantly reduce the loss of biodiversity (Balmford et al. 2005). Protected areas are also increasingly being considered in the context of the wider landscape, outlining large-scale biological corridors, ecological networks and transboundary protected areas shared between two or more countries (IUCN 2005). In the recent years global communities are advocating cooperation between the countries sharing critical transboundary areas for effective management (Secretariat to CBD 2004). In this paper, we would like to highlight the importance of KL, key principles of 'Regional Cooperation Framework', and the strategic process on transboundary biodiversity management adopted in the Landscape..



*Rhododendron barbatum*

#### **THE KHANGCHENDZONGALANDSCAPE**

The KL refers to the southern half of the area surrounding Mount Khangchendzonga that is spread across eastern Nepal, Darjeeling and Sikkim of India and western Bhutan. It is one of the richest landscapes among the 'Himalayan biodiversity hotspots and one of the world's most critical centres of biodiversity (Mittermeier et al. 2004; WWF and ICIMOD 2001). It is an important transboundary area for biodiversity conservation (Rastogi et al. 1997). There were concerns reflected on the needs of conservation efforts at a landscape level because conservation efforts in the past had narrow ecological orientation and had ignored the human element and their economic sustainability (Chettri and Sharma 2006). Further, the strategic location of the KL among the three countries makes it an appropriate conservation landscape that require regional transboundary cooperation (Sharma and Chettri 2005).



Butterfly basking in the sun, Yuksam, Sikkim

During the past several decades, conservation efforts in the KL have been focussed primarily on the establishment of Protected areas (PAs). There are 14 PAs that range in management categories from strict nature reserve to national park and conservation areas (Sharma and Chettri, 2005). In size, they range from as small as 0.04 sq km (Jore Pokhari Salamander Reserve) to as large as 2620 sq km (Khangchendzonga Biosphere Reserve). These PAs existed as scattered and isolated 'conservation islands' and the rich biodiversity in the KL continued to decline leaving majority of flagship species such as snow leopard (*Uncia uncia*), tiger (*Panthera tigris*), elephant (*Elephas maxima*), red panda (*Ailurus fulgens*), takin (*Budorcas taxicolor*) and musk deer (*Moschus chrysogaster*) to remain as critically endangered. The most pervasive threats hindering conservation efforts was that of habitat loss and fragmentation that narrowed down the habitat range of these already small populations, isolating the populations further and making them vulnerable to the extinction. Concern for such loss of globally significant species motivated conservation efforts in the KL to be directed towards increasing habitat contiguity through connecting the isolated protected areas with environmentally managed corridors and hence address conservation measures at the landscape level (Sharma and Chettri 2005; Chettri et al. 2007). Developing national networks of corridors linking PAs have been an important strategy not only for conservation at the landscape level but also for enhancing livelihoods of people through sustainable utilisation and maintenance of resources in the corridors. Connecting the PAs through corridors also provides opportunities for both vertical and horizontal coverage of habitats, ensuring sustenance of environmental goods and services for the future (Bennett and Mulongoy 2006)



Red panda (*Ailurus fulgens*), Darjeeling

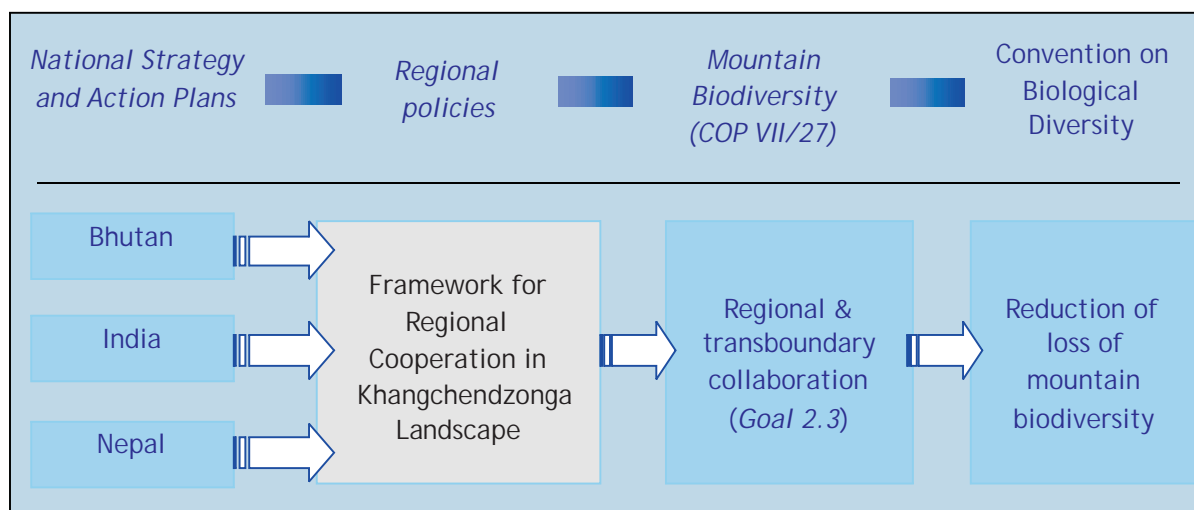
## **REGIONAL COOPERATION AND TRANSBOUNDARY BIODIVERSITY CONSERVATION**

In case of KL, transboundary biodiversity conservation has been used as an effective strategy to minimise deterioration of transboundary ecosystems. Efforts has been made to coordinate management of landscape that includes protected areas and the intervening land uses; to use conservation as entry point to enhance the quality of life of communities living close to the border regions of the three countries; and to support regional integration actions into harmonising national policies and legislation in the management of PAs and intervening lands and to promote regional cooperation so that the joint conservation efforts help minimise conflict and maintain cordial relationships across the

borders with regard to cross border learning and exchange of information and sustainable management of biodiversity resources. (Sharma and Chettri 2005; Chettri et al. 2007).

The regional consultations held in Kathmandu in 2004 provided a platform for the three countries, namely Nepal, India and Bhutan not only to share the national conservation and development elements, but also to look for the transborder issues prevailing between the two countries. This regional consultation led to the formulation of the Regional Cooperation Framework for implementation of the Convention on Biological Diversity (Sharma et al. 2007) that sought out the complementarities for regional cooperation and brought forward the elements of national policies with reference to the implementation of goal 2.3 of the Mountain Biodiversity (COP VII/27) and other goals as agreed by the CBD (Figure 1).

**Figure 1:** Policy framework for the KL in context to policy linkages from national to global levels



Based upon the common prioritized issues of over extraction of resources, haphazard land use practices, livelihood thrusts and weak enforcement of conservation policies (Table 1), the framework recommended suggestive strategies and actions based upon some principles (box 1) on transboundary biodiversity conservation, scientific and technical cooperation, information exchange and sharing, and regional guidelines and soft legal instruments (see Sharma et al 2007). The framework acts as a guide that can help adopt and apply the CBD provisions to the individual nations within the KL to help address the root cause of biodiversity loss; to encourage effective conservation planning and implementation of conservation and development actions, and to promote coordination between and among diverse actors engaged in biodiversity conservation. The framework includes many practical and workable actions such as strengthening the protected area management systems through development of conservation corridors linking PAs; promoting sustainable livelihoods by adopting conservation linked livelihood options; facilitating creation of working groups to identify research priorities; fostering documentation and exchange of research and scientific and technical data and information; promote educational and capacity building systems in line with the target group needs including women; promotion of regional voluntary guidelines for transboundary issues and develop mechanisms for joint monitoring of biodiversity and related issues within the landscape. The regional framework also suggests provision for implementation and governance mechanism since the objective of the regional framework is to bring in regional cooperation which could only be achieved through identification of tiers of stakeholders and building working partnership at local, nation regional and international levels. Some of the broad implementation roles identified for the recognised stakeholders in the KL include advocacy, capacity building, global projections and endorsement of regional political statements. Since the framework is an output of the long process of consultations with tiers of stakeholders, it recognises the local and indigenous knowledge and practices and stresses on capacity building for livelihood options, exchange of information on illegal resource extraction and animal movement and also for institutionalizing the process through national and regional committees. The framework thus serves as a functional guide for the countries sharing KL towards a common goal of effective conservation.

### **Box 1.** Principles used in developing Regional Cooperation Framework

**Participatory Management** – ensuring participation of indigenous and local communities, as well as disadvantaged and socially marginalised groups, for

biodiversity conservation and management

**Equitability** – ensuring fair and equitable sharing of benefits arising from genetic and biodiversity resources

**Sustainability** – aiming for economic, social, and environmental sustainability

**Partnerships** – building partnerships among local communities, government/non-government institutions, the corporate sector, and financial institutions.

**Ecosystem Approach** – taking an integrated approach into consideration for socioeconomic, cultural, and environmental security

**Lessons-learned Approach** – applying lessons learned from other transboundary mountain programmes including the Alpine Convention, the Carpathian Convention, and the Mount Everest transboundary programme

**Transboundary Cooperation** – promoting and strengthening transboundary cooperation

Source Sharma et al. 2007.

Building on to the regional cooperation framework (see Sharma et al. 2007), regional strategic document for biodiversity conservation in KL will have to be developed that integrates lessons learnt from the other landscape complexes such as Terai Arc Landscape, Sacred Himalayan Landscape, as well as assembles strategies from the respective national corridor plans, also incorporating strategies to address new environmental challenges such as climate change. The intended regional strategic document will help achieve a landscape level conservation in the KL through promoting transboundary biodiversity conservation, livelihood enhancement, environmental security and regional cooperation. It would provide the directions to re-orient and organise national implementation efforts and prioritize actions to enhance and support the regional activities for promotion of conservation in the KL, in particular to addressing specific transborder challenges include poaching, illegal trading in wildlife and high-value medicinal plants, illegal logging and timber extraction, Lokta debarking, dual citizenship, and customs barrier related problems.

## **STRATEGIC PROCESS TOWARDS CONSERVATION PLANNING AND DEVELOPING REGIONAL FRAMEWORK**

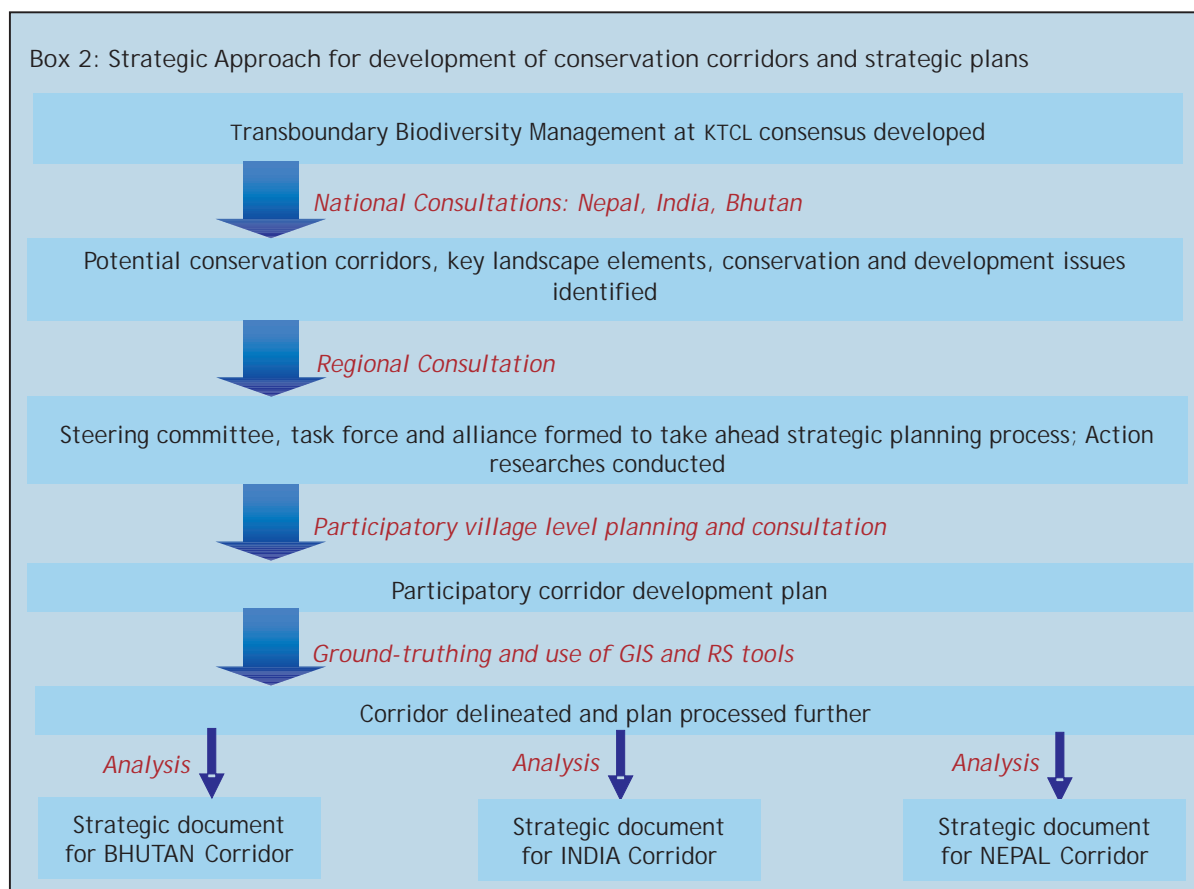
The conservation initiatives in the KL was inspired from the decisions of the seventh Conference of parties (COP VII) to the CBD that recommended the 'Ecosystem Approach' to biodiversity conservation (Secretariat to the CBD 2004), programme of work for protected areas (COP VII), and by the recommendations of the fifth world park congress (IUCN 2005). This was further guided by conservation development manual developed by Conservation International (Sanderson et al. 2003), (COP VII), and by the recommendations of the fifth world park congress (IUCN 2005). This was further guided by conservation development manual developed by Conservation International (Sanderson et al. 2003), systematic planning (Margules and Pressey 2000), bioregional planning (Olson et al. 2001) and transboundary biodiversity management criteria (Chettri and Sharma 2006). The essence of the initiative was the integrated approach to conservation that promoted partnerships building between communities and government agencies of three countries, Bhutan, India and Nepal for effective biodiversity management.

In collaborations with government representatives of the three nations, non governmental institutions and global conservation organisations, a preliminary scoping for transboundary conservations in the KL was initiated which recommended KL as a critical transboundary landscape for biodiversity conservation (Rastogi et al. 1997). The popularity of transboundary conservation landscapes in which two or more countries cooperate in management and conservation of ecologically important areas located in the border regions had substantially increased in recent years (Sharma and Chettri 2005; GoN/MFSC 2006) and it is evident that such transboundary landscape could promote



international collaborations, enhances environmental protection across wider landscapes, strengthens participatory conservation measures to mutually harness the environmental services spread across the transboundary complexes (Secretariat to CBD 2004; Chettri et al. 2006). Following the initial scoping of identifying and reviewing of existing conservation measures in KL, the necessity for adoption of corridor approach was evident and the feasibility assessment on re-establishing conservation corridors was carried out. This led to the identification of six conservation corridors linking nine protected areas (Sharma and Chettri, 2005).

Conservation corridors interconnect PAs and other relevant territories surrounding them. Human activities are promoted in these areas on sustainable development basis; that is, the activities undertaken do not endanger the rich natural resources contained therein and thus benefits both nations in general and local communities in particular. Conservation corridors are thus a flexible planning tool that interconnects protected areas through combination of land use strategies (see Bennett and Mulongoy 2006). A number of strategic considerations were taken into account while locating the corridors in the KL so as to integrate biodiversity conservation objectives into the land use management outside the PAs and to best respond to the ongoing conservation threats and also the priorities of the key stakeholders (see Chettri et al 2006; Chettri et al 2007). The strategic process thus progressed through number of consultations (local, national and regional levels), participatory planning and action researches. Global Information System and Remote sensing tools were also applied in revalidating the potential conservation corridors. Chettri et al. (2007) gives the chronological details of the strategic planning process summarised in Box 2. The process of formulation of national corridor strategies has been quiet demanding in terms of involvement of greater communications, collaborations, trust and understanding building among the diverse stakeholders of the three nations; however the approach was so designed to make the process more systematic, inclusive and participatory.



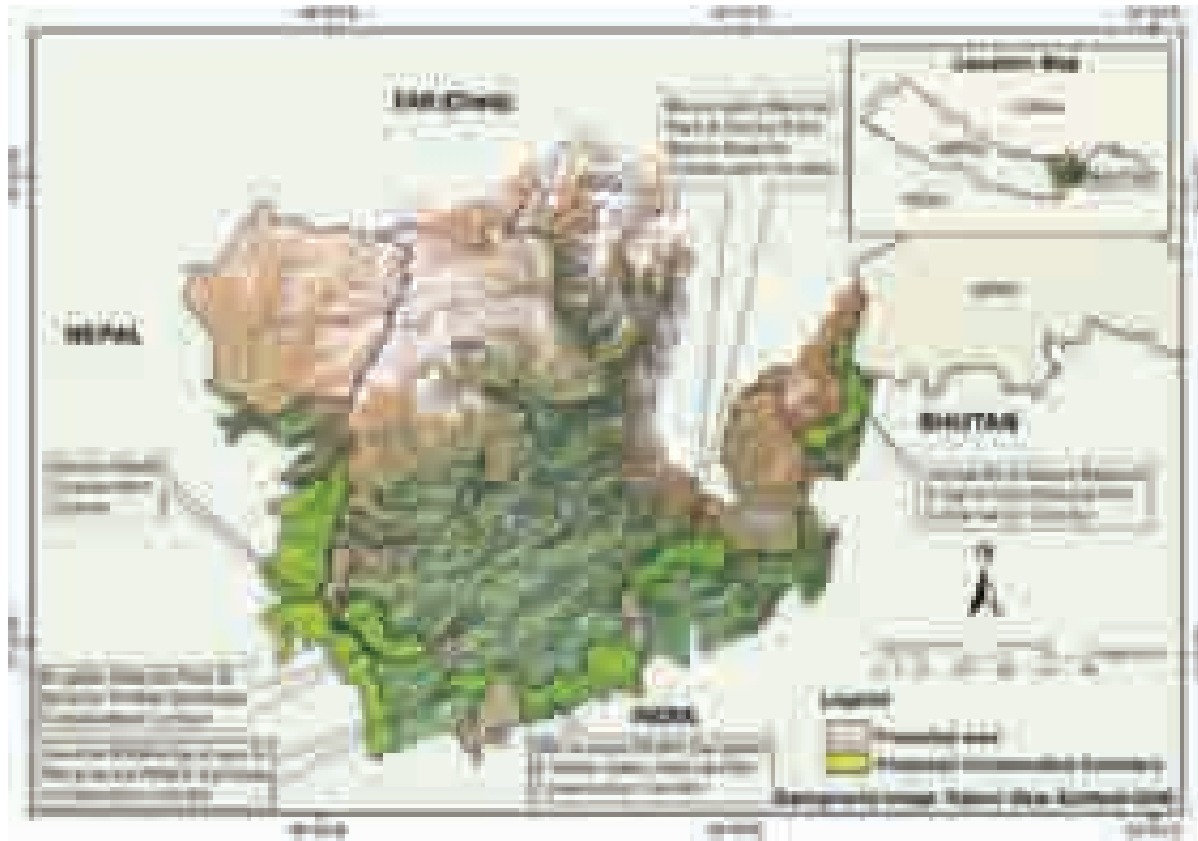
During the process three National corridor development strategies, each one from eastern Nepal, Darjeeling (India) and western Bhutan were formulated to bring together the suggestive strategies addressing the country specific conservation challenges and livelihood needs. India corridor strategies reflects on the integrated action on part of Forest Department, concerning line departments, local councils (Darjeeling Gorkha Hill Council), Panchayats

and various community institutions, authorities from the tea garden and Cinchona plantation, NGOs and various other stakeholders and puts forth the strategies under the four themes: 1. Biodiversity conservation with strategies addressing forest conversion, unsustainable resource extraction, uncontrolled grazing and human-wildlife conflict; 2. Sustainable livelihoods has strategies related to forest dependency, land tenure and agricultural productivity and alternative livelihood options; 3. Community development with strategies on building physical infrastructure and awareness and education; 4. Administration and Management that deals with strategies for better management of community functions and settlements and plantations; and 5. Policy and Coordination that has strategies dealing with policy implications and institutional cooperation. Nepal corridor strategies are integrated into Government of Nepal's broad strategic document of the Sacred Himalayan Landscape which highlights the strategies on four strategic components of biodiversity conservation, cultural integrity, Water resources and sustainable livelihoods (GoN/MoFSC 2006). Bhutan corridor strategies reflects on the biodiversity values, socioeconomic and biodiversity conservation issues revealed during the participatory consultations and draws up strategies to fulfil the broader goal of operationalising the corridor plans in relation the national Bhutan Biological Conservation Complex landscape plans (NCD 2004). The strategies for biodiversity conservation mainly focus on developing integrated measures to mitigate grazing pressures on the pastureland and prevent habitat degradation for birds; raising awareness for local communities on the importance of conservation corridors and biodiversity conservation, and for livelihoods, strategies include improving infrastructure for ecotourism and development of micro-enterprises based on incense, broom and floriculture and medicinal and aromatic plants.

### **CONSERVATION CORRIDORS, THEIR ROLE IN CONSERVATION AND PEOPLES' LIVELIHOODS**

The 14 PAs in the KL covering an area of 6032 sq km together with six conservation corridors covering 1562 sq km represents 53% of the total area of the KL (**Figure 2**). The corridors in the KL provide the existing but isolated PAs with north-south and east-west linkages with the natural and semi-natural forests. The corridors have been identified using the criteria of existing forest cover and following natural migration route for animals and also avoiding large tracts of human habitations. The corridor in Nepal connecting Kangchenjunga Conservation Area to the Khangchendzonga Biosphere Reserve in Sikkim and Barsey Rhododendron Sanctuary and Singhalila National Park of India is mainly dominated by private forests and agroforestry systems, while the remaining five corridors in India and Bhutan mainly have reserve forests under government ownership. In general, the corridors identified are areas covered with forests including community forests, reserve forests, agricultural lands and pastures. Although the identified corridor areas in India are affected by intense human activity, the forests are still extensive and very resilient and serve as an important link that would significantly increase connectivity among two well established national parks and two wildlife sanctuaries. Except small gaps at occasional places, the proposed alignments for corridors more or less followed a continuous belt of forests that are under government ownership and management. Besides, there are very few human habitations in the form of forest villages inside the corridor areas in Darjeeling. The corridor in Bhutan linking the Toorsa Strict Nature Reserve with the Jigme Dorji National Park is a part of biological conservation corridor network in Bhutan has 70-89% of land area under the forest and also had extensive pastureland. The corridor is significant as it hosts 10 of the 14 classified ecosystem types in Bhutan (Sherub 2004).

**Figure 2:** Map showing the Khangchendzonga Landscape, protected areas and the identified corridors. KCA = Kangchenjunga Conservation Area, Nepal; KBR = Khangchendzonga Biosphere Reserve, BRS = Barsey Rhododendron Sanctuary, FWS = Fambong Lho Wildlife Sanctuary, SRS = Singba Rhododendron Sanctuary, MWS = Mainam Wildlife Sanctuary, KAS = Kyongnosla Alpine Sanctuary, Sikkim, India; SNP = Singhalila National Park, SWS = Sanchel Wildlife Sanctuary, MaWS = Mahananda Wildlife Sanctuary, NVNP = Neora Valley National Park, Darjeeling, India; and TSNR = Toorsa Strict Nature Reserve, JDNP = Jigme Dorji National Park, Bhutan



Linked with the corridors are number of conservation challenges that varied in nature from land use transformations, unregulated tourism, deforestation, unsustainable harvest of biodiversity resources and access to resources. There were issues related to wild life disappearing due to biotic pressure and poaching and drastic changes in their habitat. Many of the forested paths had been broken up due to encroachment, cultivation, extensive grazing and illegal extraction of resources. In many cases, either construction of recreational areas and parks for tourism was a matter of concern or the human-wildlife conflict was a major issue. Besides, there were several other factors such as lack or shortage of drinking water, lack of infrastructure and good communication network systems that impeded economic growth and hindered the conservation actions. Thus the most pressing challenge was to enhance the environmental services and at the same time, improve the livelihoods of the communities that are dependent on these resources.

Livelihood is a critical component in a conservation paradigm and integration of community development for meeting conservation goals is an important feature of landscape approach to conservation. In the KL, transfer of traditional practices and skills have been taking place at the people-to-people level from time immemorial just as the cultural exchanges that have been binding the communities across the political borders (Oli 2004). Majority of the people residing the corridor area are economically vulnerable with their livelihoods mostly revolving around the subsistence agriculture and use of forest resources, whereas in some areas tea gardens are primary source of income. The national consultations brought out several challenges related to inaccessibility to resources and lack of alternative livelihood opportunities or lack of capacity for adapting new economic intervention. In some instances infrastructure was the issue and in others lack of modern technologies or the market information for agricultural and non-agricultural products. The socio-economic studies revealed that the corridor areas have huge conservation linked livelihood potentials such as

micro-enterprise development based on NTFPs, off season vegetable crops, organic vegetable, agroforestry and community based tourism and for the animal based products.

## **STRATEGIC FUTURE DIRECTIONS AND IMPLEMENTATION MECHANISMS**

The human development context plays a pivotal role in determining whether or not successful management of biodiversity conservation in KL is achieved. A successful conservation strategy for the KL cannot be achieved in isolation from the development of livelihood strategies for communities and ethnic groups residing in the landscape (Chettri and Sharma 2006). Local communities should have incentives to think beyond daily sustenance activities and engage in conservation activities, which can only be achieved if poor communities have secure and profitable economic and social lives, which would reduce their dependency on fragile natural resource systems. The conservation of natural resource base is the fundamental component for the KL strategic plan. It involves the protection and sustainable use of biological resources and species including entire species, ecosystems and their services. Major aim would be to customize the CBD (and other global conservation conventions) framework to the KL. Success in doing so will be dependent on actions and partnerships between communities and government agencies. The CBD encourages the parties to collaborate at the regional level in the development of regional action plans to implement the CBD Programme of Work on protected area and in the establishment of transboundary initiatives and multinational biological corridor programmes; also supporting regional agreements for environmental conservation. Regional cooperation will be the cornerstone of strategic planning and implementation in the KL. The foundations have been laid for integrative regional coordination as Bhutan, India and Nepal have created corridor strategies, integrated such strategies into national biodiversity and strategic action plans, (see Sharma et al 2007). There is still a great potential for these countries to further develop a regional strategy for management by jointly embracing the objectives of transboundary cooperation and by committing to effective administration, management, policy, and institutional coordination.

## **CONCLUSION**

The KL has been seen as the 'cornucopia of living treasures' with having a wide spectrum of ecological zones (tropical, sub-tropical, warm temperate, cool temperate, sub-alpine, and alpine), ecosystems, and species of critical global conservation importance. Prior to the Khangchendzonga initiative taken ahead by ICIMOD, there were little coordinated efforts to conserve this globally significant biodiversity. With the realisation that the earlier efforts of protecting biodiversity through creating protected areas are not adequate, the ICIMOD's initiative brought together three nations to address conservation in the KL at the landscape level. It was understood that conservation required a holistic approach at the landscape level that integrates biological, socio-cultural and economic elements into the conservation framework. The initiatives gave strong emphasis to the community development at the local level, followed by regional cooperation at the regional level to meet the global commitments. Partnership building across the tiers of stakeholders and promoting community based conservation in and around the protected areas were the major working modalities. It established a platform to analyze and achieve clarity on the corridor- level biodiversity conservation targets and work out the general guidelines for defining these targets. The integration of the participatory corridors plans into the management of the KL is a positive and productive step in the development of this transboundary initiative which demonstrates the synergy between the conservation and development. However, there is still a strong need for the three countries to establish regional transboundary cooperation for biodiversity management in the KL in addition to achieving each country's specific national conservation targets. The experience shared in the Bhutan-India-Nepal case studies on transboundary biodiversity management reflects different modalities and levels of cooperation and points towards the regional harmony, peace and cooperation for an effective conservation and management of biodiversity.

<b>Table 1. Conservation Issues in the Khangchendzonga Landscape</b>				
<b>Conservation Issue</b>	<b>KEY COMPONENTS</b>			
	<b>Bhutan</b>	<b>India</b>	<b>Nepal</b>	<b>Transboundary issues</b>
<b>Resource extraction</b>	<ul style="list-style-type: none"> <li>- poaching for bile and musk</li> <li>- collection of NTFPs</li> <li>- unregulated collection of medicinal &amp; aromatic plants</li> <li>- illegal felling of trees</li> <li>- collection of fuelwood and timber extraction</li> </ul>	<ul style="list-style-type: none"> <li>- illegal timber logging</li> <li>- firewood collection for sale</li> <li>- fodder collection</li> <li>- poaching/hunting and illegal butterfly collection</li> <li>- over-exploitation of NTFPs</li> </ul>	<ul style="list-style-type: none"> <li>- poaching</li> <li>- over-harvesting of NTFPs</li> </ul>	<ul style="list-style-type: none"> <li>- poaching (both plants and wildlife)</li> <li>- illegal fuelwood and timber extraction</li> </ul>
<b>Land-use systems</b>	<ul style="list-style-type: none"> <li>- grazing / grazing pressure</li> </ul>	<ul style="list-style-type: none"> <li>- landslide-prone areas</li> <li>- siltation</li> <li>- use of chemicals in tea gardens and agricultural lands</li> <li>- open grazing</li> <li>- encroachment and habitat destruction</li> <li>- small-scale forest fires</li> </ul>	<ul style="list-style-type: none"> <li>- forest/grazing encroachment</li> <li>- conflicting land tenure systems</li> <li>- forest fires</li> </ul>	<ul style="list-style-type: none"> <li>- cross-border grazing (transhumance)</li> </ul>
<b>Livelihood options</b>	<ul style="list-style-type: none"> <li>- livestock depredation by wild dogs and leopard</li> </ul>	<ul style="list-style-type: none"> <li>- communities with limited agricultural land and production</li> <li>- dependency of tea-garden laborers on adjoining forests</li> <li>- people-wildlife conflict</li> <li>- improper management of garbage</li> <li>- high volume of tourists</li> </ul>	<ul style="list-style-type: none"> <li>- transhumance system of animal rearing</li> <li>- large number of unproductive livestock</li> </ul>	<ul style="list-style-type: none"> <li>- cross border and unregulated tourism</li> </ul>
<b>Policies</b>		<ul style="list-style-type: none"> <li>- weak enforcement at ground and forest management practices to adopt more effective participatory approaches</li> </ul>	<ul style="list-style-type: none"> <li>- poor implementation of policies and laws outside the protected areas</li> </ul>	<ul style="list-style-type: none"> <li>- dual citizenship and ownership of resources</li> <li>- customs barriers</li> <li>- cross-border related trade issues</li> </ul>

Source: Sharma et al. 2007.

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