

Implementation of the Convention on Biological Diversity

A retrospective analysis in the
Hindu Kush-Himalayan countries



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countries

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Foreword

The Convention on Biological Diversity (CBD) is an international environmental agreement established for the conservation, sustainable use, and fair and equitable sharing of benefits of biological resources. The agreement has been ratified by 193 countries; implementation commenced in 1993. In 2004, the Conference of the Parties (CoP) adopted the 'Programme of Work on Mountain Biodiversity' with the aim of achieving a significant reduction in the rate of loss of mountain biological diversity at global, regional and national levels by 2010. In 2010, the CBD targets were reviewed and analysed at the global level.

This paper looks at the progress made in the implementation of the CBD and 2010 targets in the eight countries of the Hindu Kush-Himalayan region: Afghanistan, Bangladesh, Bhutan, China, India, Nepal, Myanmar and Pakistan. The paper was commissioned by ICIMOD, an inter-governmental institution mandated for the region, as one of its activities in support of the CBD and the International Year of Biodiversity 2010. Using the national reports to the CBD as the primary source, the paper examines the progress made by the countries in implementing the Convention. The draft paper was presented at a side event of the Hindu Kush-Himalayan (HKH) countries during the fourteenth meeting of the Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA-14) in Nairobi, Kenya for inputs from CBD focal points and participants. A pre-print was then presented at a side event 'Facing the Challenges of Mountain Biodiversity Conservation and Management in a Changing Climate across the HKH region' at the Tenth Meeting of the Conference of the Parties to the CBD in Nagoya, Japan. The comments received from the CBD focal points of the Hindu Kush-Himalayan countries, COP-10 participants, and others have been integrated in this final version.

The paper concludes that all the Hindu Kush-Himalayan countries are making efforts to prioritise conservation, but that they are at different stages of CBD implementation. The countries have taken direct and supportive actions for conservation, sustainable use, and benefit sharing of mountain biodiversity and are moving in a positive direction. Progressive conservation policies and legislation for management of biological resources in a participatory way have been developed which provide a strong basis for supporting CBD implementation in the region. The degree to which each country has been able to comply with CBD targets is a reflection of their national capacities, level of development, and specific limitations.

In future, for the implementation of the CBD, efforts need to be made to link biodiversity and livelihoods and address the challenges of poverty by assuring sustainable use of biological resources and fair and equitable sharing of benefits arising from such use. At regional level, it is encouraging to note that several countries have recently acknowledged the need for transboundary cooperation as an important tool for conservation. In this regard, ICIMOD is joining hands with these countries in developing transboundary cooperation programmes.

It is essential that new challenges such as climate change should be met and obstacles reduced through enhanced collaborative actions among the Hindu Kush-Himalayan countries in implementing the CBD strategic plan and 2020 targets. The document attempts to draw the attention of the CBD, the eight countries of the region, and other regional and international players to the current level of the CBD implementation in the region and the need to continue to support the region as it strives to achieve biodiversity conservation, sustainable use, and benefit sharing of biological resources.

This assessment will also be useful for Rio+20, specifically in the context of the 'Programme of Work on Mountain Biodiversity'. The conservation costs should become part of the green economy in the new initiatives that are likely to be discussed in the global and regional agenda in the coming years.

Andreas Schild
Director General, ICIMOD



Potato and mustard field, Naar village, Manang, Nepal

1 Introduction

Background

The Convention on Biological Diversity (CBD) was inspired by the world community's growing commitment to sustainable development. It is an important global instrument which first evolved through the United Nations Conference on Environment and Development (UNCED), the so-called Earth Summit, which was held in Rio de Janeiro in June 1992. The CBD broad objectives are a) the conservation of biodiversity, b) the sustainable use of its components, and c) the fair and equitable sharing of benefits arising from the use of genetic resources. It covers a wide spectrum of issues, ranging from protected areas and traditional knowledge on biodiversity, to incentives for the sustainable use of natural resources and the transfer of biotechnology. With such an array of areas involved, prioritising tasks has been difficult. As a result, the Convention's decision-making body, the Conference of the Parties (COP), faces a huge task in addressing all the relevant issues, a workload that is reflected in a large number of COP agenda items, documents, and decisions (CBD 2005). While several years of (often tough) negotiation preceded the passing of the Convention, in the years since its passing the number of Parties has increased significantly – it now stands at 193 states and includes the European Union.

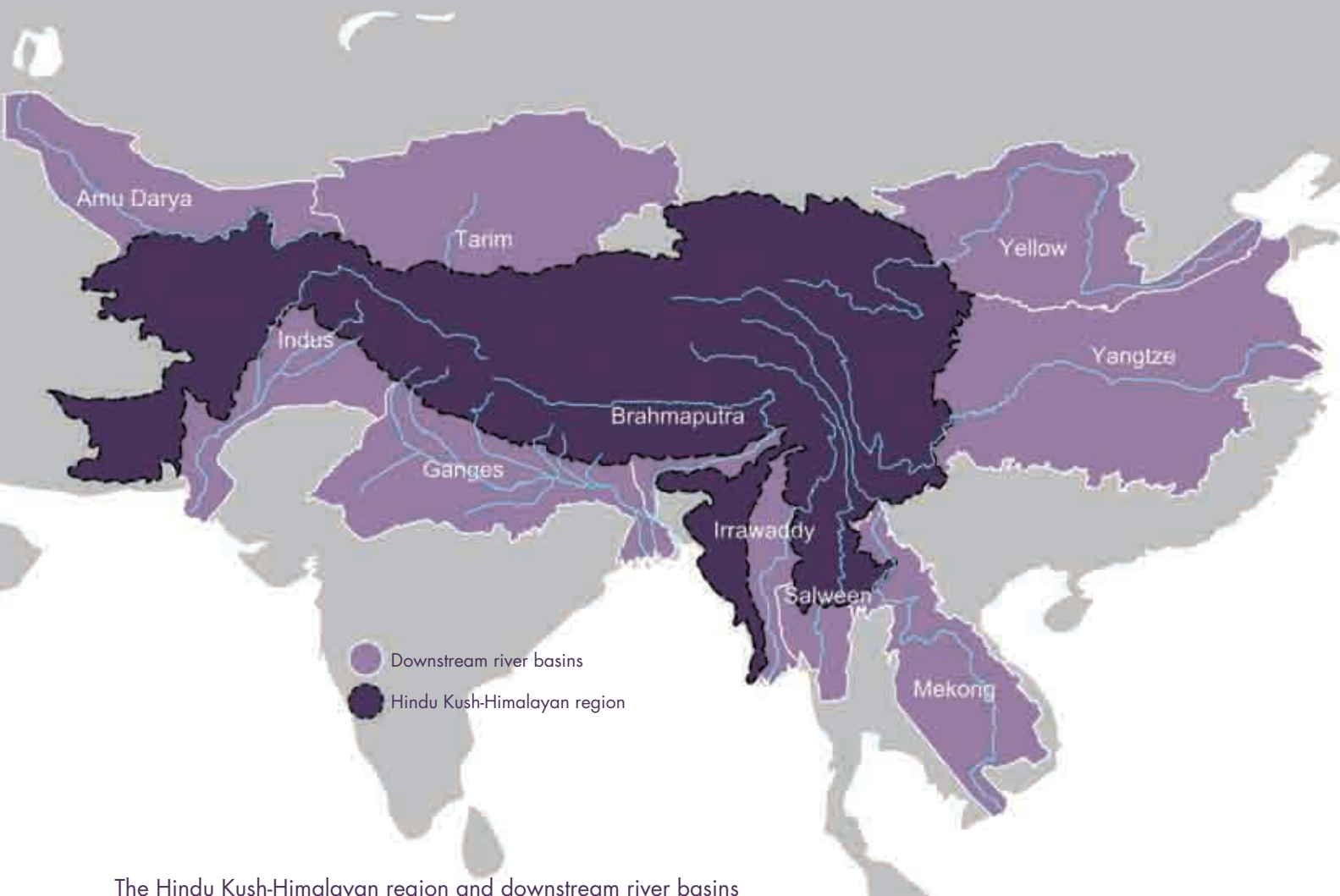
In spite of all the efforts that have been made at the local, national, regional, and global levels, many of the components of biodiversity are being lost rapidly on a worldwide scale, with significant impacts on the wellbeing of both natural systems and human societies (MA 2005). At the CBD 6th Conference of the Parties in April 2001, the countries of the world voiced their concern and the need to “achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national levels” (CBD 2001). In 2002, the heads of state and governments who attended the Johannesburg World Summit on Sustainable Development agreed to substantially reduce the rate of biodiversity loss worldwide by 2010.

Participants at the Sixth Conference of the Parties to the CBD (COP 6) held in April 2002 decided with Decision VI/26 to track the trends in biodiversity status. Two years later the COP adopted a framework of global indicators to “facilitate the assessment of progress towards achieving the 2010 Biodiversity Target and communication of this assessment, to promote coherence among the programmes of work of the Convention and to provide a flexible framework within which national and regional targets may be set, and indicators identified,” (Decision VII/30 at COP 7, held in Kuala Lumpur). The framework was further refined in CBD Decision VIII/15 to include seven focal areas and 22 global headline indicators for assessing progress toward the 2010 Target, and communicating related key messages.

Notwithstanding the efforts of the countries concerned, when the Secretariat issued the third edition of the Global Biodiversity Outlook in 2010, based on 120 national reports and 500 peer-reviewed scientific journal articles, it had to conclude that the 2010 targets had not been met (CBD 2010a). The report shows that biodiversity continues to disappear at a rate of up to 1,000 times the natural rate of extinction. The report also warns that many ecosystems may be approaching a tipping point beyond which widespread and irreversible degradation will take place. This unprecedented biodiversity crisis is compounded by climate change; ‘business as usual’ is no longer an option for mankind; decisive and coordinated action is needed to address the loss (Djoghla 2010). At the same time, the biodiversity indicators used by different institutions globally have helped development of more realistic biodiversity focal areas and indicators that can be applied in future.

The options for addressing biodiversity loss are many; determined action to conserve biodiversity and use it sustainably will lead to future rewards. Action in the coming decades will determine the continued stability of human civilization. If humanity fails to use the opportunity to conserve and sustainably use biodiversity, many ecosystems on the planet will be changed irrevocably, leading to great uncertainty for present and future generations (CBD 2010a).

The Hindu Kush-Himalayan (HKH) countries of Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan are endowed with highly diverse and important ecoregions which harbour a rich variety of gene pools and species and ecosystems of global importance (Wikramanayake et al. 2002). These countries host all or part of five of the 34 Global



The Hindu Kush-Himalayan region and downstream river basins

Biodiversity Hotspots – the Himalayan, Indo-Burman, Mountains of South-West China, Mountains of Central Asia, and Western Ghats (Mittermeier et al. 2004) – four in the mountainous Hindu Kush-Himalayan ranges. The mountainous regions of these countries, including the Tibetan Plateau, Himalayas, Nyainqentanglha, Kunlun, Hindu-Kush, Karakoram, and Tian Shan mountains, as well as the Western Ghats, Eastern Ghats, and Aravalis of Peninsular India, play an important role in providing goods and services both to the people who live in the mountain areas and to the multitudes who live downstream (Schild 2008). These areas have ecological, aesthetic, and socioeconomic significance, not only for the local people, but also for those living beyond. The mountain areas require specific attention for the contribution they make to global goods and services, which means developing and implementing mountain specific policies (Sharma et al. 2010). Realising the importance of mountains as repositories of biodiversity, and their role as providers of global goods and services, CBD COP 7 adopted the 'Mountain Biodiversity Programme of Work' as Decision VII/27 in 2004 (Sharma and Acharya 2004).

The HKH countries (see Figure 1) are all parties to the CBD and have made significant progress in addressing their commitments to the Convention (Chettri et al. 2008, Sharma et al. 2010). However, it is important to bear in mind that these countries are not only diverse in terms of their biogeophysical characteristics, they are equally diverse in terms of their geopolitical and socioeconomic situations. As a result, they are at different stages in terms of their development and, in turn, in their compliance with the CBD. This paper reviews how each of the eight Hindu Kush-Himalayan countries has implemented the CBD and COP Decision VII/27.

The Convention on Biological Diversity

In recent years, sovereign states have come to rely upon international institutions to promote inter-state cooperation on a wide range of issues (Lane 2006), and treaties have become the cornerstone of multilateral regulatory enterprises as well as being the institutionalised forms of international cooperation and coexistence (see Annex). The large number of signatories to these treaties is laudable, and represents a potentially powerful force for addressing common issues; however, the result is often that the concrete requirements of treaties need to cater to the weakest parties. The final outcome of negotiations on international treaties is often achieved through assent to the lowest common denominator.

The emergence of a consensus on the conservation of biodiversity as one of the 'common concerns of humankind' prior to the 1992 Rio Earth Summit heralded a new era in regulating global environmental problems. The 1992 Convention on Biological Diversity (CBD) was the direct result. Ratified by 193 states, it affirms the "sovereign rights (of states) over their own biological resources". However, the CBD is a clear example of a 'hard' multilateral agreement with a 'soft' underside. This is especially true with respect to the formulation of the nature of the obligations contained therein, and with respect to the implementation of the Convention by the contracting parties. Interestingly, the use of phrases such as "as far as possible and as appropriate", "in accordance with its particular conditions and capabilities", and "taking into account the special needs of developing countries" were used in some of the substantive provisions [Articles 5-12 and 14]. These and the inbuilt flexibility and latitude provided to the contracting parties, as well as other provisions, all underscore the need for an institutionalised form of cooperation [Articles 16-20]. Formulations such as "shall be provided", "shall take", "shall facilitate", "shall promote", "shall consider", and "shall also take into consideration" indicate a classical promotional pattern for seeking implementation of the CBD. Possibly, such strategising was considered necessary because the CBD emphatically recognises that "states have sovereign rights over their own biological resources" and that they are responsible "for conserving their biodiversity and for using their biological resources in a sustainable manner" (from the Preamble). In view of incorporating this unique implementation approach and strategy, we need to use 'special lenses' as well as sensitivity to examine how far the objectives of the CBD have been translated into action by the contracting parties. Thus the traditional mechanical approach of quantification in analysing implementation may not necessarily work in the case of the CBD.

The need to use a 'special lens' is particularly pertinent with regards to mountain biodiversity. In the specific case of the HKH region, apart from what was reported by the countries, we also need to use a 'sliding scale of implementation' in view of country-specific direct actions, means of implementation, and other supportive actions taken by the Parties. The CBD, in fact, seems to allow and encourage such latitude. The letter and spirit of the CBD underscores conservation and use of biodiversity in a sustainable manner. Thus the criteria to be used in analysing implementation could be to decipher the 'level' that the states of the HKH region have reached in implementing these objectives. In interpreting the language used in the relevant provisions of the CBD, it seems that the negotiators had sought to attain the CBD objectives in an amorphous way. Therefore, in analysing the relevant CBD articles as well as the CBD Programme of Work on Mountain Biodiversity (COP VII/27), it is necessary to use an innovative approach to interpret the national reports from each HKH country to the CBD Secretariat.

The advent of the CBD has stimulated debate at different levels on the rights of indigenous and marginalised local communities over biological resources in the HKH region. As a part of the complex web of regulatory frameworks that the Convention has sought to institutionalise, the HKH region has witnessed a flurry of activity such as the development of national biodiversity strategies and biodiversity action plans, the promulgation of new policies and national legal instruments, and the establishment of institutional structures to help nations achieve the goals of the CBD. While making sense of these measures on the 'sliding scale', they appear to vindicate the promotional pattern in which the CBD is being implemented.



Markhor, Pakistan



Selling wasp combs with larvae, Nagaland, India



Aconitum sp. Humla, Nepal



Black-necked crane, Bhutan

2 Analysis of Implementation

This report seeks to examine the implementation status of the CBD in the Hindu Kush-Himalayan countries – the regional member countries of the International Centre for Integrated Mountain Development (ICIMOD). The assessment is based primarily on the Third and Fourth National Reports to the CBD (CBD 2006, 2009) and the country profiles (CBD 2010b) of the countries in question (Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Pakistan) unless otherwise noted.

The assessment also builds on the twenty-two headline indicators (divided into seven focal areas) developed by the Secretariat to the CBD to help assess progress towards the 2010 targets (Table 1). While most of these indicators look at the general articles of the CBD there is also a special focus on mountains.

Table 1. The seven focal areas and twenty-two headline indicators identified by the Convention on Biological Diversity to assess progress towards the 2010 target

Focal area	Headline Indicator
1. Status and trends of the components of biodiversity	a) Trends in extent of selected biomes, ecosystems, and habitats b) Trends in abundance and distribution of selected species c) Coverage of protected areas d) Change in status of threatened species e) Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance
2. Sustainable use	a) Area of forest, agricultural and aquaculture ecosystems under sustainable management b) Proportion of products derived from sustainable sources c) Ecological footprint and related concepts
3. Threats to biodiversity	a) Nitrogen deposition b) Trends in invasive alien species
4. Ecosystem integrity and ecosystem goods and services	a) Marine Trophic Index b) Water quality of freshwater ecosystems c) Trophic integrity of other ecosystems d) Connectivity/fragmentation of ecosystems e) Incidence of human-induced ecosystem failure f) Health and wellbeing of communities that depend directly on local ecosystem goods and services g) Biodiversity for food and medicine
5. Status and trends of linguistic diversity and numbers of speakers of indigenous languages	a) Status of traditional knowledge, innovations and practices b) Other indicators of the status of indigenous and traditional knowledge
6. Status of access and benefit sharing	a) Indicator of access and benefit-sharing
7. Status of resource transfers	a) Indicator of technology transfer b) Official development assistance provided in support of the Convention

Source: Convention on Biological Diversity (www.cbd.int)

Regional Overview of CBD Implementation

The HKH countries show considerable variation with respect to the priorities they have assigned to the different articles of the CBD (Table 2). The choices they have made reflect the fact that each country is at a different level with respect to embracing conservation measures. On the one hand, emerging economies such as those of China and India give high priority to almost all of the articles, while on the other, developing countries such as Afghanistan, Bhutan, Nepal, and Pakistan give either a medium or low priority to most of the articles. While both Bangladesh and Myanmar give all articles top priority, there is some concern as to whether they will have the means to follow through on their good intentions (Table 2).

Table 2. Reflection from the third country reports of the priority of countries on CBD articles, provisions, and programme of work

Article/Provision/Programme of Work	HKH Countries							
	Afghanistan	Bangladesh	Bhutan	China	India	Myanmar	Nepal	Pakistan
Article 5 – Cooperation	→	↑	↑	↑	↑	↑	↑	↑
Article 6 – General measures for conservation and sustainable use	↑	↑	↑	↑	↑	↑	↑	↑
Article 7 – Identification and monitoring	↑	↑	→	↑	↑	↑	↑	→
Article 8 – In-situ conservation	↑	↑	↑	↑	↑	↑	↑	↑
Article 8(h) – Alien species	↓	↑	↑	↑	↑	↑	↓	↓
Article 8(j) – Traditional knowledge and related provisions	→	↑	↑	↑	↑	↑	↑	→
Article 9 – Ex-situ conservation	↓	↑	→	↑	↑	↑	→	→
Article 10 – Sustainable use of components of biological diversity	→	↑	→	↑	↑	↑	→	→
Article 11 – Incentive measures	↓	↑	→	↑	↑	↑	↑	→
Article 12 – Research and training	↓	↑	→	↑	↑	↑	→	→
Article 13 – Public education and awareness	↑	↑	→	↑	↑	↑	↑	→
Article 14 – Impact assessment and minimising adverse impacts	↑	↑	→	↑	↑	↑	↑	→
Article 15 – Access to genetic resources	↓	↑	→	↑	↑	↑	→	↑
Article 16 – Access to and transfer of technology	↓	↑	→	↑	↑	↑	↑	→
Article 17 – Exchange of information	↓	↑	→	↑	↑	↑	→	→
Article 18 – Scientific and technical cooperation	↓	↑	→	↑	↑	↑	↑	→
Article 19 – Handling of biotechnology and distribution of its benefits	↓	↑	↑	↑	↑	↑	↑	→
Article 20 – Financial resources	↓	↑	↑	↑	↑	↑	→	→
Article 21 – Financial mechanism	↓	↑	↑	↑	↑	↑	↓	→
Agricultural biodiversity	↓	↑	→	↑	↑	↑	↑	↑
Forest biodiversity	↑	↑	↑	↑	↑	↑	↑	→
Inland water biodiversity	↓	↑	→	↑	↑	↑	↓	↓
Marine and coastal biodiversity	↓	↑	↓	↑	↑	↑	↓	→
Dryland and subhumid land biodiversity	↑	↑	↓	→	↑	↑	↓	→
Mountain biodiversity	→	↑	↑	→	↑	↑	↑	↑

↑ - high priority; → - medium priority; ↓ - low priority; Source: Third National Reports from the respective countries (CBD no date a)

Table 3. Reflection from the third country reports of 2010 targets

Goals and targets towards 2010 global targets		HKH Countries							
		Afghanistan	Bangladesh	Bhutan	China	India	Myanmar*	Nepal	Pakistan
Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats, and biomes	Target 1.1 At least ten percent of each of the world's ecological regions effectively conserved	x	NT	NT	NT	NT		NT	x
	Target 1.2 Areas of particular importance to biodiversity protected	x	NT	NT	GT	NT		NT	x
Goal 2. Promote the conservation of species diversity	Target 2.1 Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups	x	NT	NT	GT	NT		NT	NT
	Target 2.2 Status of threatened species improved	x	NT	NT	NT	NT		NT	NT
Goal 3. Promote the conservation of genetic diversity	Target 3.1 Genetic diversity of crops, livestock, and harvested species of trees, fish, and wildlife, and other valuable species conserved, and associated indigenous and local knowledge maintained	x	NT	NT	NT	NT		NT	x
Goal 4. Promote sustainable use and consumption	Target 4.1 Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity	x	NT	NT	NT	NT		NT	NT
	Target 4.2 Unsustainable consumption of biological resources, or that impacts upon biodiversity, reduced	x	NT	NT	NT	NT		NT	GT
	Target 4.3 No species of wild flora or fauna endangered by international trade	x	NT	NT	NT	NT		NT	GT
Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced	Target 5.1 Rate of loss and degradation of natural habitats decreased	x	NT	NT	NT	NT		NT	x
Goal 6. Control threats from invasive alien species	Target 6.1 Pathways for major potential alien invasive species controlled	x	x	x	NT	NT		x	x
	Target 6.2 Management plans in place for major alien species that threaten ecosystems, habitats, or species	x	x	x	GT	NT		x	x
Goal 7. Address challenges to biodiversity from climate change, and pollution	Target 7.1 Maintain and enhance resilience of the components of biodiversity to adapt to climate change	x	NT	NT	NT	NT		x	NT
	Target 7.2 Reduce pollution and its impacts on biodiversity	x	NT	NT	NT	NT		x	NT
Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods	Target 8.1 Capacity of ecosystems to deliver goods and services maintained	x	NT	NT	NT	NT		x	x
	Target 8.2 Biological resources that support sustainable livelihoods, local food security, and health care, especially of poor people, maintained	x	NT	NT	NT	NT		NT	NT
Goal 9. Maintain sociocultural diversity of indigenous and local communities	Target 9.1 Protect traditional knowledge, innovations, and practices	x	NT	NT	NT	NT		NT	NT
	Target 9.2 Protect the rights of indigenous and local communities over their traditional knowledge, innovations, and practices, including their rights to benefit sharing	x	NT	NT	GT	NT		NT	NT
Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources	Target 10.1 All transfers of genetic resources are in line with the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture, and other applicable agreements	x	NT	GT	GT	NT		x	NT
	Target 10.2 Benefits arising from the commercial and other utilisation of genetic resources shared with the countries providing such resources	x	NT	GT	GT	NT		x	x
Goal 11. Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention	Target 11.1 New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20	NT	x	NT	x	NT		x	x
	Target 11.2 Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4	x	x	x	NT	NT		x	x

NT – National level targets developed; GT – Global targets used; x – targets not set; * information not available on targets for Myanmar
Source: Third National Reports from the respective country reports (<http://www.cbd.int/>)

There is a similar variation in the setting and attaining of goals and targets for 2010 (Table 3). While most countries had difficulty in setting targets for alien invasive species (Goal 6, Targets 6.1 and 6.2) and for technology transfer (Goal 11, which could have financial or technology implications), Pakistan and especially Afghanistan were weak on setting targets in general.

Protected area (PA) coverage was endorsed as a quick indicator of the degree to which a state has complied with the target of significantly reducing the rate of biodiversity loss by 2010, since the target states that "at least 10 per cent of each of the world's ecological regions [should be] effectively conserved" (CBD 2004). Similarly, protected areas are also good indicators of the success that a state has had in achieving the Millennium Development Goal 7 of ensuring environmental sustainability, since Target 9 of this Goal states "integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources" and Indicator 26 specifically requires "land area protected to maintain biological diversity". The HKH countries have expended substantial efforts to conserve forest resources and biodiversity by establishing about 3000 protected areas with a coverage of 11 per cent of the total geographical area (IUCN, UNEP-WCMC 2007) (Table 4). However, there are considerable variations among countries, and additional efforts are required to achieve the target in some countries, especially Afghanistan, Bangladesh, and Myanmar. According to the FAO, both Bangladesh and Pakistan are experiencing serious forest degradation and loss (Table 4) (FAO 2003, 2009).

Table 4. Coverage by protected areas (PAs), and forest cover and changes from 1990 to 2005

Country	Country area ('000ha)	% terrestrial area in PAs	Forest cover ('000 ha)			Forest change (%)	
			1990	2000	2005	1990-2000	2000-2005
Afghanistan	64,958	0.44	926	897	867	-3.1	-3.3
Bangladesh	13,017	1.70	1,169	1,334	871	14.1	-34.7
Bhutan	4,701	27.27	3,016	3,016	3,195	0.0	5.9
China	932,743	15.15	145,417	163,480	197,290	12.4	20.7
India	297,319	8.99	63,732	64,133	67,701	0.6	5.6
Myanmar	65,755	5.32	39,588	34,419	32,222	-13.1	-6.4
Nepal	14,300	17.86	4,683	3,900	3,636	-16.7	-6.8
Pakistan	77,087	11.85	2,755	2,361	1,903	-14.3	-19.4

Sources: FAO 2003, 2009; Sharma et al. 2010

Programme of Work on Mountain Biodiversity

The Conference of the Parties to the CBD adopted 'Mountain Biodiversity' as Decision VII/27 at its 7th meeting (COP 7), held in Kuala Lumpur in February 2004. During this meeting, 14 overarching goals and 98 actions were laid down as components of the CBD Programme of Work on Mountain Biodiversity (PoWMB). The COP called for a significant reduction in the loss of biodiversity by 2010. The Parties agreed to implement this through the ecosystem approach, wherever applicable, to reduce the rate of mountain biodiversity loss by 2010, to contribute to poverty reduction, and to benefit indigenous and local communities dependent on mountains.

All the HKH countries, which have mountain areas as part of their geographical coverage, have prioritised mountains as important ecosystems (Table 2) and the biodiversity of the mountain regions of the HKH has received significant attention. In Nepal, 68 per cent of high mountain areas are under protected area coverage (Shrestha et al. 2010), as are almost all the high mountain areas in Bhutan (RGoB/NEC 2009). Bangladesh, India, and Myanmar have also given high priority to mountain areas. In total, the HKH countries have established 488 protected areas in this region covering 39 per cent of the HKH geographical area (Chettri et al. 2008). Notwithstanding this, the HKH area is so rich in biodiversity that even though 25 per cent of protected land area in the eight countries is found in the mountains, there are still gaps in terms of ecoregions, biomes, and vegetation types (Chettri et al. 2008, Shrestha et al. 2010). In addition, although, large areas in the HKH mountains have been brought under legal protection, the conservation effectiveness of these protected areas has been questioned. The global analysis concluded that the 2010 targets of CBD have not been met (CBD 2010a) and biodiversity continues to disappear. Although no detailed analysis has been undertaken for the HKH area specifically, a similar trend can be expected.

Developing a regional cooperation framework on access and benefit sharing

Today, genetic resources are no longer considered to be a common heritage that can be treated as a 'freely accessible' commodity. The Convention on Biological Diversity (CBD) affirms that conservation of biological diversity is a common concern of mankind, while reaffirming that nations have sovereign rights over their own biological resources. The CBD has recognised the sovereign rights of countries to control and regulate the use of their genetic resources and associated traditional knowledge. This international legal instrument stresses that the authority to determine access to bio-genetic resources and associated traditional knowledge rests with national governments and is subject to national legislation. The objectives of the CBD are a) the conservation of biological diversity; b) its sustainable use; and c) the fair and equitable sharing of the benefits deriving from genetic resources. In this light, access, utilisation and conservation of genetic resources, and their proper conservation and use, remain a major concern of mankind.

The CBD is a powerful covenant and the fact that it has already been ratified by virtually all the countries of the world (193 ratifications) makes it even more so. Among its components, the section on Access and Benefit Sharing of Genetic Resources (ABS) plays a major role. Article 15 deals with the access to genetic resources, and with the fair sharing of benefits arising out of their utilisation. In article 8(j), the CBD calls upon the Parties to the Convention to respect, preserve, and maintain the knowledge, innovations, and practices of indigenous and local communities relevant for the conservation and sustainable use of biological diversity, and to encourage the equitable sharing of the benefits arising from the utilisation of such knowledge, innovations, and practices. Article 14(1) of the CBD calls for parties to enter into bilateral, regional, and multilateral co-operation and agreements for the transboundary movement of genetic resources and for cooperation, as required, in the benefit sharing of such resources. This has been supplemented by the adoption of an 'ecosystem approach' by the Conference of the Parties (COP) to the CBD, through Decisions V/6, VI/12, and VII /11 of COPs 5, 6, and 7. These decisions provide a more detailed international framework for enhanced regional cooperation.

In the light of the above, it has become apparent that a regional cooperation framework for access and benefit sharing from genetic resources in the Hindu Kush-Himalayan region could be beneficial for all the countries concerned, and also for the region's indigenous, marginalised, and local communities. ICIMOD, in collaboration with the CBD focal points of the regional member countries, has initiated development of such a regional cooperation framework. The objective is to preserve the biological and cultural diversity of the Hindu Kush-Himalayan region, to promote the use of its biological resources in ways that are sustainable and equitable, and to promote human wellbeing and security through the maintenance of ecosystem functions and integrity facilitated by access and benefit sharing. The draft regional cooperation framework was presented at the 14th meeting of the CBD Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) in Nairobi in 2010; with participation of representatives from the countries of the Hindu Kush-Himalayan region. The draft is currently being debated and discussed with a view to adoption and implementation.



Market, Sikkim, India

Source: ICIMOD 2010

Analysis of Implementation by Country

Afghanistan

Much of the information on Afghanistan's biodiversity is old and no longer reliable. Little significant information has been added since the onset of war in 1978. The few recent investigations that have been made suggest that Afghanistan's biodiversity has suffered enormously during the course of the last three decades. Afghanistan is comprised of eight biogeographical provinces; seven belong to the Palearctic Realm, while one small area in the lower Kabul River Valley has Indo-Malayan affinity. A recent classification breaks Afghanistan down into 15 smaller ecoregions of which four are considered as critical/endangered, eight as vulnerable, and only two as relatively stable and intact. Deciduous and evergreen natural forests are limited to the monsoon-influenced eastern part of the country. They once comprised about 5 per cent of Afghanistan's surface area; however, recent analyses suggest that only 5 percent of these original forests may still exist, a quarter of a per cent of the land area. Afghanistan has many indigenous species, including 118-147 species of mammals, 472-510 species of birds, 92-112 species of reptiles, 6-8 species of amphibians, 101-139 species of fish, 245 species of butterflies, and 3500-4000 species of vascular plants. Only 7 vertebrate species are known to be endemic to Afghanistan, but estimates for endemic plant species range from 20 to 30 per cent. A total of 39 species and 8 subspecies appear on the IUCN's Red List as being globally threatened by extinction. No formal assessment has been made recently of species at risk at the national scale, but numerous species, particularly large mammals, are almost certainly at risk of extinction in the country.

Ecosystem conservation

Afghanistan is a poor country that has recently experienced a three decades long conflict. One of the many consequences of this is that it is now in the grips of serious biodiversity loss and environmental degradation. Afghanistan's national reports present a gloomy picture of the loss of biodiversity and of the factors responsible for it. For example, per capita biocapacity has declined, forests are rapidly disappearing, and there has been massive land degradation (almost 8,000 sq.km were degraded between 1981 and 2003). Afghanistan consists of almost 61 per cent vulnerable and 38 per cent endangered ecoregions. In this mountainous country, rangelands and woodlands face the highest threat. It will be a huge challenge to arrest Afghanistan's rapidly declining biodiversity.

One of the underlying causes of degradation is the country's rapidly growing human population, which has almost doubled since 1979. Some of the other threats include land encroachment, over-hunting, deforestation, overgrazing, conflicts over the use of natural resources (especially by migratory pastoralists), shrub collection, dryland farming, water diversion, and climate change. Overall, these threats seem to have intensified over the years and, taken collectively, they hinder the ability to achieve the CBD target for reducing the rate of biodiversity loss by 2010.

Policy instruments

Afghanistan has undertaken considerable environmental planning since 2002, and most of this has implications for biodiversity conservation. Under Afghanistan's Environmental Law, the National Environment Protection Authority was required to prepare a National Biodiversity Strategy and Action Plan which would address both in situ and ex situ conservation (by 25 January 2009). It has also taken planning initiatives such as the National Capacity Needs Self Assessment for Global Environmental Management and the National Adaptation Programme of Action for Climate Change that specifically address implementation of the CBD. Apart from this, there has been a concerted effort by the Biodiversity and Wetlands Working Group (organised by the United Nations Environment Programme) to provide a 'comprehensive Afghan approach' to implementing the CBD, which also led to a national biodiversity assessment describing Afghanistan's biodiversity and a listing of priority actions to implement the CBD. Several international (such as the UN and specialised agencies) and regional (such as ICIMOD) organisations have been involved in assisting the Afghan government to implement the CBD.

In brief

- In spite of a tortuous period of conflict during the past two decades, Afghanistan has shown remarkable resilience by putting into place several measures to specifically address the goals laid down in the CBD Programme of Work (PoWMB)
- It will be interesting to follow up on the impact of the proposed comprehensive Afghan approach on the implementation of the CBD.
- Afghanistan will need to continue to strengthen the means of implementation through concerted efforts to build capacity.

Bangladesh

Despite its relatively small geographical area, Bangladesh harbours a great diversity of ecosystems. It is bounded to the north by the Khasi, Jaintia, and Jowai hills of North East India and to the east by the Lusai and Arakan Yoma hills of western Myanmar, which house a diversity of plants and are the site of a biodiversity hotspot. The country is a biogeographical transition area between the Indo-Gangetic plains and the eastern Himalayas and is part of the Indo-Chinese sub-region of the Oriental realm. The ecosystem types include tropical rainforests, mangrove forests, floodplains, the extensive jhum fields of the Chittagong Hill tracts, freshwater and coastal wetlands, and the littoral, sub-littoral, and benthic communities of the Bay of Bengal.

Only 20 per cent of the country's land area is considered as forest, although large parts of the alluvial and coastal plains have been reclaimed for agriculture and human habitation over the years. Approximately 12 per cent of the country's land area consists of mountain ecosystems, largely confined to the north, northeast, and southeastern areas. The Chittagong Hill Tracts and Chittagong together contain a substantial part of the hill ecosystems; the mostly low elevation hill ecosystem of Sylhet represents nine percent of the hills. The vegetation of the hill forests has generally been classified as tropical evergreen and semi-evergreen.

Ecosystem conservation

Bangladesh has 18 protected areas, which together cover 2,400 sq.km or 1.6 per cent of the country's surface area and just over 9 per cent of the forested area, and are managed by the Forestry Department. The Bangladesh Wildlife Preservation (Amendment) Act 1974, recognises three categories of protected areas: national parks, wildlife sanctuaries, and game reserves. The Bangladesh Environment Conservation Act (Act I of 1995) deals exclusively with environmental issues.

Bangladesh has various policies, strategies, and action plans that contain provisions for promoting the conservation of biodiversity of ecosystems, habitats, and biomes, as discussed below.

Policy instruments

The following policy instruments have some bearing on environmental conservation: Environment Policy (1992); National Agriculture Policy (1999); National Water Policy (1999); National Forest Policy (1994); National Fisheries Policy (1992); Livestock Development Policy (1992); National Seed Policy (1998); National Land Use Policy (2002); Renewable Energy Policy (Draft) (October 2002); Coastal Zone Policy (2004); Wetland Policy (Draft) (1998); and National Energy Policy (1995).

These policy instruments are supported by the following strategies and action plans: National Conservation Strategy (NCS); National Biodiversity Strategy and Action Plan (NBSAP); National Environment Management Action Plan (NEMAP); Freshwater Fisheries Strategy; Coastal Zone Development Strategy (Draft); Forestry Master Plan (1995); Barind Environmental Action Plan 2003; National Adaptation Program of Action (NAPA); National Action Plan under United Nations Convention to Combat Climate Change (UNCCD) (NAP); and the Inland Capture Fisheries Strategy (2005).

Bangladesh's Third National Report to the CBD reiterates the government's commitment to restoring and conserving the country's precious biodiversity and affirms that the country has indeed taken up its international biodiversity obligations seriously. The report notes, *inter alia*, that the following are under development: an eco-park covering the hill ecosystem in Sitakundoo, Chittagong; a safari park in Cox's Bazar; and a National Park in the Chittagong Hill Tracts. Afforestation programmes are being implemented to restore degraded ecosystems in the hill areas of Bangladesh including Chittagong, the Chittagong Hill Tracts (Rangamati, Khagrachari, and Bandarban), Sylhet, and Mymensingh, and in the wet deciduous sal forests. Moreover, the Nishorgo Support Project is addressing co-management of five of the protected areas in the country.

Mountain biodiversity

The country has taken some measures to prevent and mitigate the negative impacts of the key threats to mountain biodiversity, including the afforestation programme in the denuded hill areas mentioned above. The Third Report refers to activities undertaken for the conservation of important biodiversity hotspots in Chittagong, the Chittagong Hill Tracts, and Rampahar and Sitapahar (in the Chittagong Region) and cites these as illustrative examples of the resolve to prevent and mitigate the threats to mountain biodiversity. The following activities are also included as examples of efforts designed to protect, recover

and restore mountain biodiversity: 1) co-management of protected areas in Chunati and Teknaf; 2) conservation of Sitakundu Hill as an eco-park; and 3) conservation activities in Lawachara and Rema-kalenga of Sylhet.

The Third Report notes that Bangladesh is also considering measures to promote the sustainable use of mountain biological resources and to maintain genetic diversity in mountain ecosystems, and lists several initiatives which have been planned and executed in this regard. Bangladesh has prepared a draft law on 'Biodiversity and Community Knowledge Protection' for sharing the benefits arising from the use of biological resources and associated traditional knowledge. This is a very progressive measure that will entrust communities with rights over the use of their biological resources and ensure that they benefit from the biogenetic resources and associated traditional knowledge. This bill is still being debated.

Bangladesh is currently engaged in strengthening its legal, policy, and institutional framework for the conservation and sustainable use of mountain biodiversity, as well as for implementing the CBD Programme of Work (PoWMB). As part of this, ICIMOD has identified the Chittagong Hill Tracts and Cherapunji (in India) as a potential site for conservation and management as a transboundary landscape. This work is in the initial stages, and details of how to develop transboundary cooperative agreements for managing mountain ecosystems are still being worked out. At the same time, several national measures for identifying, monitoring, and assessing mountain biodiversity are also in the pipeline. Similarly, measures for improving research, technical and scientific cooperation, and capacity building for conservation and sustainable use of mountain biodiversity are also being evolved at the respective levels.

The Third Report gauges the country's mood on environmental protection and affirms that general awareness on biodiversity conservation has increased. Capacity for plantation programmes has improved as a result of targeted training programmes. A social forestry campaign in the mountain areas is helping to rehabilitate denuded hill areas. The government is considering establishing new protected areas. Nevertheless, in spite of the good progress that has been made, the persistent problems of absence of effective community-based institutional mechanisms, lack of awareness, lack of inter-sectoral coordination, lack of human capacity, lack of financial resources, and a rapidly growing population continue to undermine the country's efforts at biodiversity conservation.

In brief

- Bangladesh has clearly taken some measures towards promoting the sustainable use of mountain biodiversity and towards helping to preserve genetic diversity in the mountains.
- As yet, no concrete measures have been taken to share benefits arising out of the utilisation of mountain genetic resources and associated traditional knowledge, or to protect such knowledge, although a draft law on 'Biodiversity and Community Knowledge Protection' is being discussed.
- The country needs to initiate a programme for developing effective institutional mechanisms at different levels to raise awareness, support inter and intra sectoral collaboration, and provide financial resources for the effective implementation of the CBD.

Bhutan

Bhutan is a small landlocked country situated on the southern slopes of the Eastern Himalayas. Bhutan's location gives it abrupt altitudinal variation and diverse ecosystems rich in biodiversity (Sherpa et al. 2004). As a result, Bhutan is included in several global priorities for biodiversity conservation such as the Global 200 Ecoregion complex (Olson and Dinerstein 1998) and the Himalaya Hotspot (Mittermeier et al. 2004). Bhutan has three distinct ecozones: alpine, temperate, and temperate conifer and broadleaf forest. Forests cover 72.5 per cent of the territory. The country harbours 5603 vascular plant species, 667 bird species, 200 species of mammal, 49 species of freshwater fish, and an uncounted number of invertebrates.

Ecosystem conservation

The Royal Government of Bhutan has a policy (which is also part of its constitutional mandate) to ensure that at least 60 per cent forest cover is guaranteed in perpetuity. In addition, nearly 40 per cent of the country is designated as protected area, and an additional 9.5 per cent is set aside as 'biological corridors', which are treated as Bhutan Biological Conservation Complexes (NCD 2004). Bhutan currently has 10 protected areas (5 national parks, 4 wildlife reserves, and 1 strict nature reserve), of which 6 are currently operational and 4 will be operational by 2013. In addition, Bhutan has about 13 conservation areas of which two are under effective management and 11 are under some form of intervention. The country

is also making efforts to protect and manage its biological resources and biodiversity. Bhutan's Third National Report to the CBD makes the point that scarcity of financial resources and a lack of technical expertise are the main constraints limiting implementation of the CBD. Despite these limitations, Bhutan is doing its part by developing and implementing landscape plans, and linking protected areas by establishing biological corridors. Bhutan is attempting to build a satisfactory network of institutions that will provide protection and sustainable development for its biodiversity and trying to secure international cooperation and technology transfer for these.

Bhutan has taken some direct actions to prevent and mitigate the negative impacts of the key threats to mountain biodiversity. Bhutan's natural environment is largely intact and most of its forest areas are considered primeval; however, there is a lack of detailed information on exactly what the biological resources are, since scarce financial resources and insufficient technical and technological expertise have limited rigorous investigation. Despite legal arrangements, the above constraints have limited supporting actions for conservation, the sustainable use of resources, and benefit sharing, as well as for identification and monitoring processes, all of which appear weak. There is an apparent lack of specific measures regarding most goals related to supporting actions, and as yet no substantive measures have materialised for promoting development and validating and transferring appropriate technologies (including indigenous technologies) for mountain ecosystems in accordance with Article 8 (j) and related provisions. Nevertheless, Bhutan is trying to raise awareness of its biodiversity through various means, such as the media, the school curriculum, by establishing nature clubs, and so on.

Policy instruments

The rules and regulations promulgated to protect and conserve Bhutan's biodiversity include the Biodiversity Action Plans (BAP 1, 1998; BAP 2, 2002; and BAP 3, 2009), Environment Impact Assessment Act (2000) and Regulations (2002), Biodiversity Act 2003, Tiger Action Plan for the Kingdom of Bhutan (2006-2015), National Environment Protection Act (2007), Forest Act (1969), Forest and Nature Conservation Act (1995), Livestock Act (2000), Mines and Minerals Act (1995), and the National Forest Policy (1974). Bhutan has recently been revising its policy on the conservation of biological resources and has developed and drafted rules for the implementation of a biodiversity law. Arrangements for 'access to genetic resources' are currently based on material transfer agreements between the parties involved. The major means of implementation include institutions such as the Bhutan Trust Fund for Environmental Conservation, the National Environment Commission, the National Biodiversity Centre, and some NGOs such as the Royal Society for the Protection of Nature.

In brief

- Efforts aimed at the protection and management of Bhutan's biological resources and biodiversity are currently under way.
- In recent years, Bhutan has undertaken specific measures to conserve mountain biodiversity, such as developing corridors to link protected areas.
- Legal arrangements have been developed for access and benefit sharing from biological resources and associated traditional knowledge.
- Scarcity of resources and lack of technical expertise are the main factors constraining the steady advance towards implementation of the CBD.

China

China has some of the richest biodiversity in the world, with more than 35,000 species of higher plants and 6,347 species of vertebrates. It is not only rich in species diversity but also has a high level of endemism; it has about 17,300 species of endemic higher plants and 667 species of endemic vertebrates. China also has abundant genetic resources and is one of the world's eight centres of origin for crop plants. China is a mountainous country: nearly three-quarters of its total national land area is mountainous; approximately 70 per cent of the population relies on mountain resources; over 80 per cent of its ethnic minorities live in mountain areas; and mountains provide approximately 70 per cent of the national freshwater resources. Most of China's key hotspots for biodiversity, and its important nature reserves, are found in its mountain areas. China understandably attaches great importance to the conservation and sustainable use of mountain biodiversity.

Ecosystem conservation

China uses the establishment and management of nature reserves as a primary approach to biodiversity conservation. By the end of 2007, China had established 2,531 nature reserves (not including protected areas in Hong Kong, Macao and

Taiwan) covering a total land area of almost 152 million ha. Terrestrial reserves account for about 15.2 per cent of China's land area. From 1999 to 2007, the number and coverage of nature reserves in China increased significantly, and their coverage now exceeds the world average. A national nature reserve system has taken shape. Significant results have been achieved through the active support of encouraging financial policies, increased investment in conservation of natural forest resources, and various other initiatives. Protected mountain areas now account for over 14 per cent of China's total mountain area. The populations of some wild animals and plants are stable and increasing; they now range over larger distribution areas and the environments they inhabit keep improving. For example, habitats for the giant panda increased to 2,277,000 ha (34,500,000 mu) from 1,376,000 ha (20,850,000 mu); this 65.6 per cent increase in habitat was matched by an over 40 per cent increase in the giant panda population.

Since 2002, China has succeeded in treating and rehabilitating about 19 thousand sq.km of desertified land annually – more than the amount which becomes desertified each year. In total, 19 provinces have reported that their sandy desertified areas are lessening year by year. The key desertified regions of Inner Mongolia, Xinjiang, and Ningxia are now pleased to report a reduction in the amount of desertified area and an overall improvement in ecological conditions. The frequency of sandstorms is also decreasing.

China has carried out restoration of degraded mountain ecosystems and the regeneration of biodiversity on a massive scale. The latest research and monitoring results show that the area with a high rate of water and soil loss has dropped from 3,670,000 square kilometres to 110,000 square kilometres. In 2003, sediment load in 11 major rivers nationwide was greatly reduced, including in the Yangtze and Huaihe Rivers, each of which reported 50 percent reductions.

In order to restore and reconstruct damaged or degraded ecosystems, the Chinese Government has adopted major measures and implemented projects aimed at the conservation of natural forest resources, returning farmland to forest, and establishment of key shelter forest systems in three areas of the Yangtze river (north, central, and downstream). By the end of 2004, 7.78 million ha (118 million mu) of farmland on steep inclines had been returned to forest in the western region, and 11.22 million ha (170 million mu) of barren mountains and wastelands had been reforested. The practice of cultivating steep slopes and converting forest to expand agricultural land has been effectively contained. The forest cover has increased on average by two per cent. Forest resources in project areas increased greatly and the loss of water and soil was mitigated. Since 2003, the Government has started returning grazing lands back to grasslands; to date 12.54 million ha (190 million mu) of severely degraded grasslands have been treated, and the trend of grassland deterioration in project areas has been effectively halted.

The major measures used to bring about compliance with the CBD include enacting relevant laws and regulations, constructing a reserve system, implementing forest ecological construction projects (such as the protection of forest natural resources, and strengthening the protection and management of wild animals and plants), implementing in situ conservation of crop wild close relatives, and ensuring that laws are enforced, as well taking measures to educate the public.

Policy instruments

China has enacted various laws and regulations regarding the conservation and sustainable use of biodiversity; some of which also cover mountain ecosystems and mountain biodiversity. These include, inter alia, the Environmental Protection Law, Forest Law, Law on Protection of Wild Animals, Grassland Law, Law on Conservation of Water and Soil, Regulation on Protection Management of Wild Animal Medicine Material (1987), Regulation on Management of Breeder and Breeding Poultry (1994), Natural Reserve Regulation, and Regulation on Protection of Wild Plants. The enactment of the Law on Conservancy of Water and Soil, and Enforcement Regulation on Conservancy of Water and Soil (1993), brings water and soil conservation in the mountain areas of China in line with measures aimed at prevention and control according to public law. Most of these laws existed prior to the commencement of the CBD.

China has promulgated a number of relevant national policies over the past few decades including the Action Plan of Conservation of Biological Diversity, 21st Century Agenda of China, National Outline on Environmental Protection, National Tenth Five-Year Plan on Environmental Protection, and Outline on Development and Outline of Nature Reserve of China. In the National Plan for Eco-Environmental Improvement and the National Program for Eco-Environmental Protection formulated by the State Council (in 1998 and 2000 respectively), a great deal of attention has been paid to ecological improvement and environmental protection in mountain areas. For example, in the Tibet Autonomous Region (TAR), a separate plan was drawn up to make the permafrost zone on the Qinghai-Tibet Plateau one of the country's eight major areas

for ecological improvement. In 2000, on the basis of this plan, the People's Government of the TAR formulated the Eco-Environmental Improvement Plan for the TAR, which has since provided an overall programme for Tibet's eco-environmental improvement. The central government has increased its investment in mountain areas and has shown a marked interest in the conservation and sustainable use of mountain biodiversity. China ratified and implemented the National Outline on Environmental Protection, which oversees all work related to ecological construction and ecological conservation (including mountain ecosystems), as well as all work related to the conservation of water and soil; it is a key component in China's implementation of a sustainable development strategy.

In recent years, China has been an active participant in several regional initiatives. It participated in the Cooperation Mechanism of the Great Mekong River Sub-region, which was initiated by the Asian Development Bank, and in the planning of a biodiversity corridor for the Great Mekong River Sub-region. China also participated in the regional cooperative programme for Himalayan biodiversity.

Benefit sharing

China attaches great importance to mountain development and has adopted some measures related to sharing of the benefits arising from the utilisation of mountain genetic resources. These include the following: (1) state and local governments attach great importance to benefit sharing and they list the development and utilisation of mountain genetic resources as one of their key priorities; they provide key support in terms of capital and technology and local governments help to strengthen the leadership of those involved with the utilisation of mountain genetic resources; the government has helped to establish special lead groups to deal with industrialisation; (2) establishing a service system for popularising technologies; (3) strengthening training in practical production technologies; (4) establishing mechanisms for benefit sharing.

For example, Jinzhai County of Anhui Province has a long history of Chinese chestnut cultivation. This county has abundant species resources and is one of the main distribution centres for Chinese chestnuts in the Yangtze river basin. With the increase in the production of Chinese chestnuts, the processing, distribution, and transportation industries affiliated with it have also prospered. At present, the county has over 16 million Chinese chestnut trees, and its economy revolves around this crop. Gradually, the poor and backward appearance of this area is being transformed. Chinese chestnuts have always been cultivated here, but concerted efforts at popularising this traditional crop have helped to alleviate poverty and are now helping to make farmers rich.

The Liupan mountain area in Ningxia has over 700 kinds of medical plants. The government has tried to attract pharmaceutical companies to develop an industrialised approach to the development of traditional Chinese medicinal products, so that cultivation of medicinal plants can become the foundation of a whole new modern industry in the region, and thus help the development of the local economy. Everyone in the area was enthusiastic at the prospect of having a new modern industry based on local plants and know-how. What remains to be done is to see how market forces will guide farmers as to what medicinal plant crops they will cultivate; here the decisions of the farmers need to be fully respected, and farmers assured of the right to make their own decisions based on the local conditions and plant characteristics.

China has amended existing laws and developed regulatory instruments to help facilitate access to genetic resources and associated traditional knowledge, and also ensure that the benefits are returned to the holders of the resources and to those who have the associated traditional knowledge. For example, China instituted the Husbandry Law, which provides details on the regulation of access to livestock genetic resources and sharing of the benefits from their use. Article 6 reads as follows: "The export of livestock genetic resources (for those animals included in the protected list) shall be allowed when it meets the following conditions: 1) clear indication of their intended use; 2) consistency with the goals and objectives set in the national programme for conservation and use of livestock genetic resources; 3) posing no threat to domestic production and export of livestock products; and 4) putting in place a reasonable arrangement for benefit-sharing."

The Chinese Seed Law (July 2000) incorporates the principle of national sovereignty over genetic resources: "The State will exercise national sovereignty over genetic resources, therefore any institution and/or individual that wishes to provide germplasm resources to foreign institutions and/or individuals must obtain approval from the national authorities responsible for agriculture and forestry." With this, China has developed defensive protection of its biological/genetic resources; however, as yet there is no umbrella legislation for the management of biodiversity in general. A Traditional Knowledge Digital Library has been compiled and is available for the protection of traditional knowledge from piracy. In addition, the government has established administrative procedures which foreign partners (individuals, research and development

agencies) must follow before they can undertake research, conduct a bio-survey, or utilise biological resources. There are still many unanswered questions with respect to benefit sharing for some biological species which have multiple uses with associated traditional knowledge. The questions are related to how a specific biological/genetic material can be transferred in isolation, and what the prevailing legal arrangements are for both plant and animal resources. The international multilateral environmental agreement has not defined these issues clearly.

Mountain biodiversity

China has established a monitoring network for major mountain ecosystems and the monitoring of key species; it has also carried out a large amount of research. The national forest resource monitoring services (and the local counterparts) are now conducting the seventh national forest resource investigation. The Chinese Academy of Sciences established the China Ecosystem Research Network (CERN) which consists of nine research stations that study forest ecology. These stations investigate the structure, function, succession, and species ebb and flow of mountain ecosystems. National research on biological resources was carried out to gain a complete picture of China's biological species resources (including genetic resources). This study included crops, domesticated animals, forest trees, flowers, medical plants, aquatic life, and microscopic life forms of mountain ecosystems, and the bioresources of species found in nature reserves.

China's national science and technology programme established special projects to strengthen the scientific study of conservation and sustainable use of mountain biodiversity. The Tenth Five-Year National Program for the development of science and technology sponsored a programme on Research and Demonstration of Construction Technologies of Forest Ecological Projects. Since the CBD came into effect, China has been granted funds by the Global Environment Facility to implement some projects in the field of conservation of mountain biodiversity. China has also had technical cooperation activities with several countries (Germany, Holland, Japan, Australia, and others) on the conservation and sustainable use of mountain biodiversity.

With the support of national and local scientific and technical programmes, China is looking into some key technologies for the restoration and reconstruction of mountain ecosystems and biodiversity. For example, the National Integrated Development Office for Mountainous Areas periodically hosts field experience exchange meetings on the integrated development of mountain areas. These meetings provide an opportunity to summarise and exchange experiences on mountain development; and are a forum where the mechanisms and modes for developing mountain areas can be discussed, summarised, and shared. Some provinces, cities, and counties also promote development of demonstration projects aimed at protecting and utilising local mountain resources through field exchange meetings, symposia, and workshops.

Technological development and awareness raising have facilitated the conservation and restoration of mountain ecosystems. For example, in the belt of Luodian County of Guishou Province (where the Guishou plateau turns into the Guangxi hills), the natural conditions are poor, the environment is degraded, and severe desertification has taken place as a consequence of human activity. This area is characteristically karst stony desert. The local people of Dagan village saw an opportunity of 'hacking mountain to build field, use of rainwater', to reverse the sequence of 'forests turns to scrubland, then to grassland, and finally to stony desert'. They have succeeded in returning the ecosystem to a productive state by first stabilising it, and the productive ecosystem is sustaining the development of the local economy. This demonstration was so successful that it has become a model for the ecological reconstruction of karst sandy desertified mountain areas.

Challenges ahead

Over the past two decades, China has developed and adopted a considerable number of policies and laws related to the conservation of biological resources; however, only a few deal with the collection and trade of genetic resources, and even fewer with access to and benefit sharing of their use and associated traditional knowledge. Both of these aspects are important for CBD implementation. A notable exception is the Husbandry Law (adopted on 29 December 2005), which for the first time includes an article that explicitly deals with the sharing of benefits from the use of livestock genetic resources (Article 16). Another noteworthy recent development was the adoption (in September 2008) of the Regulation Concerning the Approval of Import and Export of Livestock Genetic Resources and International Collaborative Research Using Livestock Genetic Resources of the People's Republic of China. Similarly, another important development was an amendment to the revised Patent Law 2008, which requires applicants to disclose the source of the genetic resources used in their inventions.

Despite the major efforts that China has made in the conservation of biodiversity, mountain biodiversity in China still faces severe threats. Natural habitats are degraded, forests have low ecological functionality, water and soil are being lost, and

land desertification is still very serious. There continues to be a conflict between conservation and development. Moreover, the management capacity at nature reserves is low, and technologies and funding are in shortage of supply. Protective rescue measures are needed to help conserve China's very rare mountain ecosystems and mountain biodiversity.

In brief

- China has taken direct and supporting actions for the conservation, sustainable use, and benefit sharing from its biological resources.
- Means of implementation are still needed for diversification and scaling up of the proven good practices.
- China still faces threats to its mountain biodiversity.
- Large areas have been brought under nature reserves, however the effectiveness of conservation needs further strengthening.
- There is a need to harmonise the apparent conflict between conservation and development.

India

India has only 2.5 per cent of the world's land area, yet it harbours 7.8 per cent of the world's recorded species. India is also rich in traditional and indigenous knowledge, both coded and informal. It possesses a great diversity of ecological habitats and ecosystems including forests, grasslands, wetlands, coastal and marine ecosystems, and desert ecosystems. It is not surprising, therefore, that India is considered one of the 17 'megadiverse' countries of the world in terms of biodiversity. It has so far documented over 92,200 species of animals and 45,500 species of plants in 10 biogeographic regions. Moreover, India contains all or part of three Global Biodiversity Hotspots. However, India also has about 4.9 per cent of the world's threatened faunal species (as per the IUCN's 2008 Red List).

In view of its concern for the conservation of biodiversity, India has established a reasonable framework of direct actions for conservation, sustainable use, and benefit sharing. This comprises not only policy measures but also a legislative and institutional framework to provide a strong backbone for meeting the objectives of the CBD.

Ecosystem conservation

India has developed a conservation plan framework for establishing a comprehensive network of protected areas that are biogeographically representative. For this it has prepared the National Wildlife Action Plan (2002-2016) which has 13 thematic areas for the protection of wildlife and for protected area management. Currently, nearly 4.8 per cent of India's land mass is under protected area management in the form of 99 national parks and 515 wildlife sanctuaries. Transboundary protected areas have been established to link protected areas, and this has also enhanced regional cooperation with the neighbouring countries of Bangladesh, Bhutan, Nepal, and Pakistan. The ecosystem approach to landscape planning has been adopted in principle; however, it is proving difficult to implement in practice, because of conflicting sectoral interests and competing land use systems.

Policy instruments

The seminal direct actions include the National Agricultural Policy (2000), the Protection of Plant Varieties and Farmers' Rights Act (2001), the National Seeds Policy (2002), the Biological Diversity Act (2002), the National Wildlife Action Plan (2002-16), the National Environment Policy (2006), the National Biotechnology Development Strategy (2007), the National Biodiversity Action Plan (2008), and the National Action Plan on Climate Change (2008). India has also recently introduced two new categories of protected areas - conservation reserves and community reserves - both of which will help to integrate and enhance community participation in protected area management, although it is not yet clear how these will be implemented.

The major means of implementation include the Entities of Incomparable Value (as defined in the National Environment Policy 2006); Scheduled Tribes and Other Traditional Forest Dwellers (as per the Recognition of Forest Rights Act, 2006); the Wildlife Crime Control Bureau; integration of biodiversity concerns into the environmental impact assessment of development projects under Environmental Impact Assessment (Notification 2006) and Draft Coastal Management Zone (Notification 2008); promotion of best practices by awarding Plant Genome Saviour Community Recognition to farming communities; creation of the National Tiger Conservation Authority (2006); and the establishment of the National Fisheries Development Board (2006).

The overarching institution responsible for environmental protection in India, and therefore for the various international conventions, is the Ministry of Environment and Forests of the central government. India became a signatory to the CBD in December 1993 and ratified the Convention in February 1994. The institutional mechanisms for ensuring the implementation of the goals of the CBD in general, as well as the COP VII/27 in particular, include specialised bodies like the National Biodiversity Authority, National Tiger Conservation Authority, National Afforestation and Eco-Development Board, and National Medicinal Plants Board. In addition to these, there are also cross-sectoral initiatives like the National Rural Employment Guarantee Scheme (2005) which cover activities such as natural resource management, afforestation, flood protection, and water harvesting.

There is a considerable amount of legislation to aid in the conservation of biological diversity. This includes 1) The Wildlife (Protection) Act (1972), Amended 1992; 2) Forest (Conservation) Act (1980); 3) Environment Impact Assessment Notification (1994); 4) National Environment Appellate Authority Act (1997); 5) Environment (Protection) Act 1986; and 6) National Environment Tribunal Act (1995). India promulgated a Biodiversity Law in 2002 for the effective implementation of the third objective of CBD, with provisions for an administrative institutional mechanism and trust funds at national, state and local level. Despite this, however, non-formal trade in biological resources and associated traditional knowledge still continue from the country and remain unabated. There are problems of intellectual property rights, in particular to benefit sharing from genetic resources and associated traditional knowledge, where the legal instruments are not clear. Awareness among local/tribal communities is growing on their rights to their traditional knowledge and ownership over their biological resources, but until now they have not received any significant benefits.

Since the nature of the challenge for the conservation of biodiversity in India is formidable, it warrants supporting actions such as education and awareness programmes; improving the knowledge base; data and information management; improvements in research and technical and scientific cooperation; and transferring of appropriate technologies for mountain ecosystems. In this context, India has a reasonably good network of institutions that provide the basis to put into effect the National Action Plan and Strategy for the implementation of the CBD. The network of institutions includes the Forest Research Institute, Wildlife Institute of India, Indian Council of Forestry Research and Education, and GB Pant Institute of Himalayan Environment and Development, as well as a wide network of Centres of Excellence (such as those dedicated to environmental education, environmental economics, and Indian systems of medicine) and scientific research entities (such as the Botanical Survey, Zoological Survey, and Forest Survey).

Mountain biodiversity

India values conservation and has established 173 protected areas in its Himalayan states (including 28 national parks and 107 wildlife sanctuaries) with a total area of approximately 47,500 sq.km. The borders of the Himalayan states extend beyond the limits of the Himalayan mountain region. The protected area coverage in the Indian Himalayan region itself has also steadily increased over the years. The protected areas in the Himalayan biogeographic zone include 12 national parks (7,367 sq.km) and 65 wildlife sanctuaries (16,066 sq.km), which cover just over 11 per cent of the zone. In addition to national parks and wildlife sanctuaries, the Government of India has established six Biosphere Reserves in this zone (out of 15 in the whole country), and eight Ramsar Sites (out of 25 in the whole country). Of the five natural World Heritage Sites recognised by UNESCO (the United Nations Educational, Scientific, and Cultural Organisation) in India, three are located in the Himalayan region: viz, Nanda Devi National Park, Kaziranga National Park, and Manas National Park. The Valley of Flowers National Park has also been included as an extension to Nanda Devi National Park, and the Kangchendzonga and Namdapha National Parks are included in the tentative list of sites. The importance of natural sites is further acknowledged in an externally aided project – the World Heritage Biodiversity Programme for India: Building Partnerships to Support UNESCO's World Heritage Site Programme. The GB Pant Institute of Himalayan Environment and Development has been mandated for biodiversity research and development in the Indian Himalayan region.

In brief

- The magnitude of the challenge for the conservation of biodiversity in India is formidable.
- The institutional mechanisms for ensuring the implementation of the goals of the CBD in general, and the Programme of Work on Mountain Biodiversity in particular, need to be galvanised in earnest.
- Direct and supportive actions for conservation, sustainable use, and benefit sharing need to be strengthened.
- The means of implementation could be more innovative and diversified.

Myanmar

The Union of Myanmar is located in the northwest of the Indochina region and is bordered to the north and northeast by China, to the east and southeast by Laos and Thailand, to the south by the Andaman Sea and the Bay of Bengal, and to the west by Bangladesh and India. Myanmar stretches for 805 km from east to west and 2,090 km from north to south, with a total area of 676,577 sq.km and a coastline of 2,832 km. The wide range of latitude from north to south, and wide range of elevation result in a high diversity. The Himalayas to the north, with snow capped mountains over 5,800 masl, coral reefs and lowland forests to the south, and an extensive river system, all contribute to a complex network of ecosystems and rich biodiversity (WCMC 1994). The country has a diverse range of forest types with a total of 52 per cent forest cover. There is a complex array of plains, major rivers, and plateaus that run parallel to each other creating unique ecosystems that support a large variety of flora and fauna. In total, eight major ecosystems have been recognised: forests, mountains, dry and sub-humid lands, mangrove forests, inland fresh water areas, grasslands, and marine and small island ecosystems. The high species diversity and endemism, together with the vast intact landscapes, make Myanmar one of the most important Indo-Pacific mainland countries for biodiversity conservation (Dinerstein and Wikramanayake 1993).

Ecosystem conservation

The fragile ecosystems of Myanmar require proper conservation to maintain the diverse functions that are beneficial to humankind. Myanmar has focused on various aspects to ensure the conservation of its biodiversity in general and its mountain biodiversity in particular. It has focused on public awareness and public participation in the conservation of biodiversity; data and information management for monitoring, research, and benefit sharing; and cooperation in the area of technology transfer.

Myanmar has established protected areas in the northern part of its territory near the headwaters of the Irrawaddy River, which will go some way to addressing conservation, sustainable use, and benefit sharing of biodiversity resources. In addition, the *Thirty Year Master Plans* for different sectors have provisions for the conservation of mountain ecosystems. Myanmar has undertaken afforestation programmes in the degraded hill areas of its Shan, Chin, and Kachin States and imposed a ban on the hunting of wildlife. The country has also undertaken watershed restoration and management projects to protect, rehabilitate, and restore mountain biodiversity. Myanmar's Agenda 21 and *Thirty Year Master Plans* also provide for the sustainable use of mountain biodiversity resources. However, poor public awareness and lack of education have emerged as major impediments; inadequate financial, human, and institutional resources also stand in the way of the sustainable use of mountain biodiversity.

Myanmar is using the 'prior informed consent' mechanism and 'mutually agreed terms' for access to, and sharing of, benefits arising from the utilisation of genetic resources from mountain biodiversity. Agreements involve memorandums of understanding and material transfer agreements by default, but without putting a biodiversity law in place. These agreements appear to apply precautionary measures relating to access and benefit sharing. In addition, a National Biosafety Framework is in preparation. In order to maintain genetic diversity in mountain ecosystems, especially through the preservation and maintenance of traditional knowledge and practices, Myanmar has instituted a set of rules called the *Community Forestry Instructions* which have provisions for knowledge innovations and for the preservation of the practices used by local communities to help to preserve mountain ecosystems.

As discussed below, Myanmar has a regulatory framework in place which covers a wide range of acts and regulations to support the concerted efforts for the implementation of conservation, sustainable use, and benefit-sharing. The country is also cooperating with international research organisations to promote technical and scientific cooperation in order to establish regional and transboundary collaboration and cooperative agreements, for example, through participation in Association of Southeast Asian Nations (ASEAN) activities.

Myanmar has undertaken a series of actions to support conservation, sustainable use, and benefit sharing. These include carrying out a survey to identify its flora and fauna, including identification, monitoring, and assessment of mountain biodiversity, and implementation of a National Biosafety Framework Project to monitor adverse impacts on biodiversity. As a part of other measures, different sectors of the government are involved in public education, participation, and awareness with respect to mountain biodiversity. The school and university curricula all have an emphasis on environmental conservation. Different sectors of the Government of Myanmar appear to promote biodiversity issues effectively through the media and other forms of public relations and communications networks at the national level. An electronic portal has been developed for communication, education, and public awareness.

Policy instruments

The rules and regulations promulgated to protect and conserve Myanmar's biodiversity (both before and after the implementation of the CBD) include the following: Elephant Preservation Act (1879), Amendment to Elephant Preservation Act (1883), Forest Act (1902), the Wild Birds and Animals Protection Act (1912), the Protection of Wildlife Act (1936), Amendment to the Protection of Wildlife Act (1956), Forest Law (1992), the Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law (1994), Forest Rules (1994), Forest Policy (1995), the Protection of Wildlife and Wild Plants and Conservation of Natural Areas Rules (2002), the Law Relating to Aquaculture (1989), the Myanmar Marine Fisheries Law (1990), the Freshwater Fisheries Law (1991), the Plant Pest Quarantine Law (1993), and the Plant Quarantine Law (1993). Myanmar's Community Forestry Instructions have some provisions on respecting the knowledge, innovation, and practices held by local communities [Article 8 (j)].

In brief

- Myanmar has some sectoral legislation, but no specific legislation to give effect to its CBD obligations.
- It has no provisions specifically directed at the protection of mountain biodiversity.
- It seems that official legal measures have yet to be developed for sharing benefits arising out of utilisation of mountain genetic resources.
- There is a need for measures aimed at the preservation and maintenance of traditional knowledge.

Nepal

Nepal is a landlocked country; hills and high mountains cover approximately 86 per cent of the total land area. The climate varies from subtropical monsoon in the lowlands to arctic tundra in the high Himalayas. It has a rich biodiversity with 342 endemic plant and 160 endemic animal species. More than 20 percent of the total area is under protected area coverage, with protected areas scattered throughout the country in the Terai, mid-hills, and high mountains. The varied climatic conditions give rise to a wide variety of ecosystems and habitats, including forests, wetlands, mountains, and agricultural land.

Though Nepal has made efforts and has achieved some measure of success in the areas of protection and management of its biological resources and biodiversity, there remain areas where there are challenges and constraints to making this success sustainable. Nepal has taken steps to ensure public awareness and participation; to harmonise policy, plans and programmes; to provide facilities for research, development, and information management; and to provide technical and institutional facilities to address genetic diversity and benefit sharing as well as to transfer technologies suited to mountain ecosystems. Nepal has a satisfactory network of institutions that provide a basis for its strategy to implement the CBD, including the Ministry of Forests and Soil Conservation, the Ministry of Agriculture and Cooperatives, and the Ministry of Environment Science and Technology.

Ecosystem conservation

Nepal has established a protected area network representing 63 ecosystems in its high mountains to prevent and mitigate the negative impacts of the key threats to mountain biodiversity. It has taken three approaches to biodiversity management in the mountains: 1) participatory management of forests, wildlife and watersheds; 2) enterprise-based community involvement in biodiversity management; and 3) a landscape approach to biodiversity management. While Nepal has taken these steps to put in place some protection for mountain biodiversity, the recovery and restoration efforts remain weak, partly because there is insufficient data and information on the status of species and ecosystems in mountain areas.

How sustainable the use of mountain biological resources is in Nepal remains unclear because of the lack of a resource inventory. In situ conservation of wild species and ex situ conservation of domesticated plants are being promoted. Interestingly, Nepal has taken up an initiative to promote access to, and sharing of, benefits arising from the utilisation of genetic resources related to mountain biodiversity. Nepal has drafted an Access to Genetic Resources Bill (and affiliated Regulations) which is awaiting ordinance. Similarly, a National Adaptation Action Plan (2010) is being drafted to address the issue of climate change. A draft biological corridor policy for linking protected areas (and disturbed landscapes) is being discussed in order to help preserve genetic diversity in mountain ecosystems (especially through the preservation and maintenance of traditional knowledge and practices).

In addition to a large inventory of means for the implementation of conservation, sustainable use, and benefit sharing, Nepal has taken some steps to help preserve and maintain the knowledge, practices, and innovations of its indigenous and local communities in mountain areas. The country has started to document traditional knowledge and practices related to the use of biological resources, but it seems that other mechanisms for the protection of traditional knowledge are weak and still evolving. Nepal has taken the initiative in regional and transboundary collaboration and for the establishment of cooperative agreements to develop and link an estimated 6000 sq.km of fragmented protected areas in the Kanchenjunga Landscape (GoN/MFSC 2006).

In terms of supporting actions for conservation, sustainable use, and benefit sharing, Nepal's efforts to identify, monitor, and assess mountain biodiversity are somewhat piecemeal and limited. Its wildlife census is limited only to Asiatic one-horned rhinos and tigers. Some biodiversity monitoring has started in the lowland national parks with the participation of local communities. The Guideline for Biodiversity Assessment and Monitoring has recently been developed and is being used in mountain protected areas. Nepal has conducted some plant exploration and identification programmes in mountain biodiversity, but on a limited scale due to the lack of funds. Nepal's Biodiversity Strategy (HMG/MFSC 2002) focuses on monitoring the parameters of habitats, ground conditions, indicator species, benefit sharing, management, and physical parameters.

In order to improve research, technical and scientific cooperation, and other forms of capacity building related to mountain biodiversity, Nepal has undertaken plant exploration activities on a limited scale. But it still does not have overall plans aimed at promoting technical and scientific cooperation on a larger scale. Some emphasis has been given to increasing public education, participation, and awareness in relation to mountain biodiversity through the media, television, and national radio. Nepal has also included information on biodiversity conservation in the environmental education curriculum of primary, secondary, and tertiary level schools. Separate courses on biodiversity are also being taught. Nepal has started the listing and development of appropriate technologies as stipulated in Article 8 (j), but there is no practice of validation to date.

Policy instruments

Nepal has put into place a reasonable framework of direct actions for conservation, sustainable use, and benefit sharing, reflecting its concerns for the conservation of biodiversity. This comprises not only policy measures but also a legislative and institutional framework to provide strong impetus to meet the objectives of the CBD. Some of the seminal direct actions include the Biodiversity Strategy (2002), Agricultural Policy (2004), National Wetland Policy (2003), Water Resource Strategy (2002), Herbs and NTFP Policy (2004), Working Policy on Wildlife Farming, Breeding and Research (2003), National EIA Guidelines (1993), EIA Guidelines for the Forestry Sector (1995), Guidelines for Review of IEE and of Forestry Sector (reports) (2003), Manual for the Forestry Sector (2004), Biosafety Guidelines (2005), and the Sustainable Development Agenda (2003).

The major means of implementation include the National Parks and Wildlife Conservation Act (1973), the Forest Act (1993) and Regulations (1995), the Local Self-Government Act (1999) and Regulations (2000), the Environment Protection Act (1996) and Regulations (1997), the Seed Act (1989) and Regulations (1998), the Aquatic Life Protection Act (1961), the Water Resources Act (1992) and Regulations (1993), the Soil Conservation and Watershed Management Act (1982) and Regulations (1985), the King Mahendra Trust for Nature Conservation Act (1982) and Regulations (1985), the National Parks and Wildlife Conservation Act (1973) with successive amendments and the National Parks and Wildlife Protection Regulations (1974), the Wildlife Reserve Regulations (1977), the Himali National Parks Regulations (1980), the Buffer Zone Management Regulations (1996), the Conservation Area Management Regulations (1996), and the Government Management on Conservation Area Regulations (2000).

In brief

- Nepal has achieved some success in the protection and management of its biological resources and diversity.
- There are still some areas where problems and constraints need to be overcome to make this success sustainable.
- Measures are in place for the protection of mountain biodiversity, but recovery and restoration are lagging because of insufficient data and information on the status of species and ecosystems in mountains.
- Steps have been taken to document traditional knowledge and practices; but the protection of traditional knowledge remains weak.
- Nepal's efforts for identification, monitoring, and assessment of mountain biodiversity appear to be somewhat piecemeal and limited.

Pakistan

Based on the physiographic characteristics, Pakistan contains ten agro-ecological zones. It includes examples of three of the world's eight biogeographic realms, four of the world's ten biomes, and three of the world's four domains, and is rich in biodiversity. Almost one-third of its area is rangelands. The varied climatic conditions give rise to a wide range of ecosystems and habitats that include forests, wetlands, mountains, and agriculture, each with a range of biodiversity. Pakistan has 195 recorded mammal species (including 13 sub-species), of which six are endemic; 668 bird species, of which 25 are endangered; 177 reptile species, of which 13 are endemic, (including 14 turtles, 1 crocodile, 90 lizards, and 65 snakes); 22 species of amphibians, of which 9 are endemic; and 198 freshwater fish species, of which 29 are endemic. So far more than 5,000 species of invertebrates have been identified. There are over 5,700 species of flowering plants, of which more than 400 are endemic. Pakistan is rich in indigenous crop diversity, with an estimated 3,000 taxa and approximately 500 wild crop relatives.

Ecosystem conservation

Among the direct actions taken for conservation, sustainable use, and benefit sharing, Pakistan launched the Protected Areas Management Project to protect nationally and globally important habitats and species. The Project aims to conserve natural habitats and improve the capacity of government agencies and community institutions. Pakistan has also undertaken a Mountain Areas Conservatory Project to mitigate threats to biodiversity in the western Himalayas, Karakoram, and Hindu Kush ranges in its northern territories; and initiated the following projects, among others, to protect, recover, and restore mountain biodiversity: Malakand Biodiversity Conservation Project; Upper Siran Biodiversity Conservation Project; Deosai Brown Bear Project; Sustainable Resources Use and Biodiversity Conservation at key sites in the Northern Areas; Integrated Conservation and Development Support for Karambar Valley; Conservation of Snow Leopard of Pakistan; Palas Conservation and Development Project; Conservation of Migratory Birds in Chitral; and the Pakistan Wetland Project.

Pakistan has sought to promote the sustainable use of mountain biological resources and maintain genetic diversity in mountain areas through its Mountain Areas Conservation Project. The thrust areas under this project are empowering and enhancing the capacity of local communities and creating appropriate frameworks for the same, a ban on hunting, and conservation of medicinal and aromatic plants through in situ and ex situ conservation practices. The issue of access and benefit sharing is in a consultation phase. A draft Access and Benefit Sharing Law has been circulated to stakeholders for comment. Its main emphasis is on prior informed consent, material transfer agreements, and mutually agreed terms.

With regard to implementing conservation, sustainable use, and benefit sharing, Pakistan has established several legal, policy, institutional, and economic frameworks, including establishing a Federal Biodiversity Steering Committee; constituting a Provisional Biodiversity Steering Committee; reconstituting a Biodiversity Working Group; establishing a Biodiversity Secretariat; and adopting a Biodiversity Action Plan.

Pakistan has undertaken to address the goal of establishing regional transboundary collaboration as well as establishing cooperative agreements. It has sought to do this by establishing various conservation forums and working groups for transboundary cooperation and the development of ecotourism in the transboundary areas of the Karakoram mountains. It has also undertaken programmes of scientific cooperation and has exchanged experts to enhance its capacity for species surveys and research.

Pakistan has also sought to introduce supporting actions for conservation, sustainable use, and benefit sharing. This has mostly been in terms of work on identification, monitoring, and assessment of mountain biodiversity. Many projects have been initiated at both a public and a private level in different areas of Pakistan to develop work on identification, monitoring, and assessment of mountain biodiversity. The following projects have contributed especially to exploring the biodiversity of the mountain regions: The Biology of Butterflies of Northern Pakistan; Zoogeographical Studies of the Flies of Medicinal Importance of Pakistan; and Small Mammals of Pakistan.

Pakistan has taken concerted steps towards improving its knowledge on and methods for the assessment and monitoring of the status and trends of mountain biodiversity. The Pakistan Museum of Natural History, universities with departments of zoology and botany, the Zoological Survey of Pakistan, and the Pakistan Forest Institute are instrumental in species and ecosystems identification activities. In order to improve research, technical and scientific cooperation, and other forms of capacity building activities related to mountain biodiversity, the Government of Pakistan has started to fund research in different disciplines of biodiversity at its universities and research institutes.

Pakistan has also initiated various measures for public awareness and participation in relation to mountain biodiversity. The more important measures include raising awareness through seminars, symposia, and the media (radio and TV talk shows and newspapers); including biological aspects of environmental studies in school curricula; and launching websites on different aspects of biodiversity. In addition, many NGOs, rural support programmes, and Global Environment Facility funded projects are working at the grass roots level to inform communities in rural areas. As regards measures to promote the development, validation, and transfer of appropriate technologies for mountain ecosystems, including indigenous technologies (in accordance with Article 8 (j)), Pakistan has drafted a Plant Breeders' Rights Act that includes a ban on the use of genetic use restriction technologies (GURTs). The Biodiversity Directorate has also developed a project for the implementation of the Bonn Guidelines.

Although Pakistan has made some good progress towards the protection and management of its biological resources and diversity, the lack of a proper compilation of identified species and the lack of adequate awareness among the general population challenge the sustainability of the various measures taken. Pakistan has targeted these problems by taking steps to ensure public awareness and participation; by harmonising policies, plans, and programmes; by providing facilities for research and development and for information systems; and by dedicating technical and institutional facilities to the study of genetic diversity and benefit sharing, and the transfer of technologies suited to mountain ecosystems. Pakistan appears to have a satisfactory network of institutions that provide a basis on which to conduct Pakistan's strategy for the implementation of the CBD.

Policy instruments

In keeping with its concerns for the conservation of biodiversity, Pakistan has put into place a reasonable framework of direct actions for conservation, sustainable use, and benefit sharing. This comprises not only policy measures but also a legislative and institutional framework that provides a strong impetus to meet the objectives of the CBD. The important measures taken in this respect include the Biodiversity Action Plan (2000), the Forest Sector Master Plan (1992), the Pakistan Wetland Project, the Pakistan Environmental Policy (2005), the Pakistan Fisheries Policy (2006), the Mountain Area Conservation Project, the Protected Area Management Project, the Plant Breeders' Rights Act (draft), the Biosafety Rules (2005), the Agha Khan Rural Support Programme, and the Patent Ordinance (2000). The major means of implementation include the Biodiversity Directorate, the Pakistan Forest Institute, the Pakistan Environment Protection Act 1997, the Zoological Survey Department, the National Agricultural Research Centre, the National Forestry Programme Facility, the Pakistan Museum of Natural History, and the National Agricultural Research Council.

In brief

- A lack of adequate identification of the various species and a lack of awareness among the population is undermining the sustainability of the various measures taken.
- There is a need for an integrated approach in the various schemes undertaken for the protection of mountain biodiversity.
- Specific measures do not seem to have been taken to share benefits arising specifically out of the utilisation of mountain genetic resources.
- Measures for preservation and maintenance of traditional knowledge are needed.



Peacock river, Kailash region, TAR, China

3 Emerging Regional and Bilateral Cooperation

Regional cooperation in transboundary landscapes can contribute to the joint management of transboundary biodiversity conservation efforts; scientific, technical, and monitoring cooperation; sharing and exchange of information; and the joint development and implementation of regional guidelines. ICIMOD's first effort at conceptualising a regional cooperation framework was made in the Kangchenjunga Landscape (Sharma et al. 2007).

Outside the Hindu Kush-Himalayan region, a few models already exist of binding agreements for the development of transboundary landscapes and biodiversity conservation in the form of regional conventions, for example the Alpine and Carpathian Conventions. More recently, several bilateral agreements have emerged in the Hindu Kush-Himalayan region. Two recent agreements in the field of biodiversity conservation were discussed in 2010 between Nepal and China, and Nepal and India. These two bilateral cooperation initiatives provide the basis for a more elaborate regional cooperation framework in the future. For example, the Memorandum of Understanding on 'Cooperation in the Field of Forestry and Biodiversity Conservation', which was signed on 3rd June 2010 between the Ministry of Forests and Soil Conservation, Government of Nepal, and the State Forestry Administration, People's Republic of China, expresses a commitment between Nepal and China to implement the obligations of multilateral agreements and conventions to protect the environment and to conserve biodiversity. Major areas of cooperation are in the areas of formulating forestry policies and strategies, forest management, addressing adverse effects on forests, wildlife conservation (including the illegal hunting of animals and illegal trade of their body parts), scientific research, and public awareness. Similarly, a resolution between Nepal's Department of National Parks and Wildlife Conservation and the National Tiger Conservation Authority of the Ministry of Environment and Forests of India (signed on 29th July 2010), an outcome of the Fourth Nepal-India Consultative Meeting, expresses concerns about the increasing threats to biodiversity caused by various factors and realises the urgent need for effective action. The resolution focused, inter alia, on conservation of endangered species (including the tiger, rhino, and elephant), capacity building, joint monitoring arrangements, and cooperation on recognised priority landscapes.

In order to further regional cooperation, ICIMOD is actively showcasing the Kangchenjunga Landscape pilot in various international and global forums (Sharma and Chettri 2005; Chettri and Shakya 2010), which has led to increased impetus and recognition over the last few years. Recently, ICIMOD has identified

Regional cooperation framework for implementation of the CBD in the Kanchenjunga landscape

ICIMOD has worked together with partners to develop a regional cooperation framework for implementation of the CBD in the Kangchenjunga landscape, which extends across parts of Bhutan, India, and Nepal. The framework is a guide with provisions that can be adapted and applied by the individual countries in the landscape to achieve cooperation for implementation of the CBD at national level. The framework is a tool to help address the root causes of biodiversity loss in the landscape; encourage fast track planning and implementation of programmes; and enhance complementarity and coordination between and among the diverse actors engaged in biodiversity conservation in the landscape. The framework is implemented through four elements: 1) transboundary cooperation; 2) scientific and technical cooperation; 3) information exchange and sharing; and 4) regional guidelines and soft legal instruments. The framework presents minimum standards and indicators under each of these four elements. Using a participatory approach, six potential conservation corridors linking nine protected areas have been identified within the framework. Community-based conservation projects focusing on improving community livelihoods through adoption of conservation-linked development activities are being implemented in these conservation corridors.

Source: Sharma, et al. (2007)

Status of the protected area system in the Hindu Kush-Himalayas – protected area coverage

The status of the protected area system in the Hindu Kush-Himalayan (HKH) region was reviewed taking into account different facets of protected area (PA) expansion, including the increase in PA number and coverage, distribution and extent of Important Bird Areas (IBAs), and distribution and coverage of global biodiversity hotspots and the Global 200 Ecoregions that fall within the HKH region. The analysis showed that biodiversity conservation is a priority for the eight countries of the HKH, who had established 488 PAs by 2007 covering 39% of the total geographical area, the first as early as 1918 and with an increasing trend over the past decades. Of these, IBAs comprise 11% of the geographical area, more than a quarter of the total PA area, and above the global target of 10% of area. The PA coverage within the Himalayan part of China alone is significant (covering 35.5% of the HKH area), followed by India (1.46%) and Nepal (0.58%). The majority of PAs belong to IUCN Management Category V (39%), followed by Category IV (29%). Only 0.6% of PAs are managed as Category I; Categories V and VI have increased in recent years. Of the total Hindu Kush-Himalayan geographical area, 32% is covered by four global biodiversity hotspots and 62% by the Global 200 Ecoregions. However, only 25% of the global biodiversity hotspots and 40% of the Global 200 Ecoregions are included in the PA network. Coordinated and committed efforts are required in the region to bring other critical habitats within the PA network.

Source: Chettri et al. (2008)

seven transboundary landscapes in the Hindu Kush-Himalayan region and initiated interventions in three of them (the Kangchenjunga, Kailash, and Brahmaputra-Salween Landscapes (Chettri et al. 2008). Mountain-specific tools have been developed for analysing how effective protected areas have been in addressing the evolving challenges of regional cooperation, and reaching the targets set out in the Programme of Work on Mountain Biodiversity (Sharma et al. 2010). ICIMOD, in collaboration with its partners, has developed a draft regional cooperation framework on access and benefit sharing from biological resources which was discussed at the SBSTTA 14 Meeting (held in Nairobi in May 2010) (Oli et al. 2010). Other regional cooperation efforts are also emerging. For example, a regional cooperation framework is being developed for the conservation and management of the Kailash/Gang Rin Po Che transboundary landscape between China, India, and Nepal, in part to meet the provisions stipulated in Article 5 and 14(c) of the CBD (Zomer et al. 2010).

4 Discussion and Conclusions

This analysis of how the CBD is being implemented in the Hindu Kush-Himalayan countries shows a clear vindication of the 'promotional' pattern of seeking implementation of a multilateral environmental agreement such as the CBD. All the countries whose reports have been analysed have earnestly sought to put into place measures to ensure implementation of the CBD, especially as stipulated in the COP Decision VII/27. These countries have taken both direct actions and supporting actions for conservation, sustainable use, and benefit sharing of mountain biodiversity. An interesting pattern can be discerned concerning the 'means of implementation'. The considerable differences in socioeconomic-political conditions in the eight countries might lead to the expectation of a non-uniform pattern of implementation. However, by using a 'sliding scale of implementation', it is clear that all the countries are in consonance with the original architecture propounded by the CBD but are at different stages of implementation. Nevertheless problems and challenges remain.

While the present analysis is largely based on a review of the National Reports, it still clearly shows the countries' progressive development in policy and legal frameworks for the conservation, sustainable use, and sharing of benefits of biodiversity. Nepal is an example of a model Himalayan country that has developed progressive conservation policies and legislation for the management of biological resources. Its participatory protected area management, community forest management, and unique system of forest conservation and protected area management by user groups, are worth mentioning. Similarly, in India, the joint forest management, social forestry programmes, and Panchayatvan are all forward looking policy instruments. However, implementation remains relatively poor. Some countries face greater challenges since they have had to contend with either violent conflicts or massive natural disasters (or both). Conflict can vie with conservation efforts for the government's attention. For example, Nepal is a young democracy that has just emerged from ten years of armed insurgency, during which time lack of a stable government system enabled a forest 'mafia' to flourish, so that even some community forest user groups, the guardians of the forests, participated in forest degradation. Similar situations exist in the conflict-laden countries of Afghanistan and Pakistan where security and livelihood priorities eclipse conservation priorities. Thus, in spite of innovative policies and laws, when a government's priorities are on addressing conflict, forests continue to be degraded (see Table 4) and there is a continuous loss of biodiversity. In these countries, violent conflict is the major hurdle to the conservation, sustainable use, and benefit sharing of biological resources.

A second constraint is poverty. The majority of people in the HKH mountain regions are poor, and while a globalised and more affluent world increasingly values biodiversity, for HKH mountain dwellers the daily demands of making a living in a harsh environment often takes precedence over biodiversity conservation. Income inequality especially remains a major factor impeding the implementation of the CBD because it influences the quality of social relations and thus conservation. In unequal societies, trust does not always exist among different groups and this has consequences for resource management.

The third constraint is the knowledge gap between what is agreed in policy at the regional level, and how it is understood and practised at the local level. The CBD is little known and poorly understood among the members of civil society and at many levels of administration. The knowledge gap extends to the implementation of the CBD, and the extent to which required technologies have or have not been transferred from the developed world to the poor mountain areas. Other than a few examples of methods for assessing populations of wild animals, and limited research for academic interests, technology transfer has barely taken place.

The fourth constraint is that while for reporting purposes the Hindu Kush-Himalayan region is divided along country boundaries, the biodiversity resources generally do not follow political divisions and routinely cross national borders. Efforts are needed to develop bilateral and regional cooperation frameworks in order to conserve such species and protect common genetic resources and associated traditional knowledge. The early indications of bilateral and transboundary cooperation are encouraging; however it remains to be seen how the policies will be implemented.

To conclude, the HKH region is a bioculturally rich and diverse region, worthy as a whole of conservation efforts to preserve its biotic richness and high endemism. The Convention on Biological Diversity sets out obligations and objectives intended to help parties cope with biodiversity loss, and encourages them to develop measures to conserve and manage biodiversity. The present review was undertaken six years after the COP to the CBD adopted the Mountain Biodiversity Programme of Work as Decision VII/27 (in 2004), in order to take stock and examine how each of the Hindu Kush-Himalayan countries has developed policies and legal frameworks for CBD implementation. The analysis was based mainly on a review of the National Reports to the CBD, together with some field results. Overall, the countries have made efforts to improve conservation and have made progress towards attaining the CBD goals. However, certain factors have affected the rate at which capacity has been built and the relative importance that each government has afforded to implementing the CBD. These factors include inadequate scientific capacity, political instability in some countries and violent conflicts in others, capacity development, and accessibility of resources. Lack of resources and institutional limitations are identified as major impediments to fulfilling obligations. In this context, concerted efforts are required to incorporate biodiversity into broader inter-sectoral policies. In addition, the measures required to ensure the fair and equitable sharing of benefits arising from the use of biodiversity and its associated traditional knowledge are poorly developed in the region, if at all. Any attempt to conserve biodiversity in the region must include sustainable use and equity.

The present challenges to implementation can be taken care of in due course through concerted efforts to ensure capacity building as well as by building financial and technological capacity in the countries of the Hindu Kush-Himalayas. Further, public private/community partnership for the implementation of the CBD is growing. This will in future potentially bring benefits to the country through conservation and sustainable use of biodiversity. On the whole, it seems that the soft approach and political latitude built into the CBD process, as seen through the sliding scale of implementation, provides suitable room for the countries in the region to do better in addressing the challenge of conservation, sustainable use, and benefit sharing of mountain biodiversity.

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Annex The Global Multilateral Environmental Agreement Regime

In a rapidly changing global environment, sovereign states have come to rely upon international institutions to promote interstate cooperation on a wide range of issues (Lane 2006). The process of institutionalising cooperation is based on the bedrock of 'shared sovereignties' which has emerged as the need of the hour and is one of the best tools to address global challenges in their various manifestations (Sharma et al. 2007). Thus, institutionalised cooperation appears to have emerged as a functional necessity. It has ushered in an intricate mosaic of treaties at the bilateral, regional, and global levels (Kim 2003). Treaties have now become the cornerstone of multilateral regulatory enterprises as well as being the institutionalised forms of international cooperation and coexistence. The process of centralised legalisation on sectoral environmental problems has been almost entirely institutionalised over the course of the past three decades. In spite of the fact that this multilateral law-making modus operandi has worked in a piecemeal, ad hoc, and sporadic manner, it has nevertheless contributed to thickening the web of treaties as the predominant method (Harvard 1991) of regulating state behaviour on a global problem. The term 'treaty' is itself subject to the intention of the parties as well as the content of the instrument itself; according to the Vienna Convention on the Law of Treaties (1969) it is "an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation." (see Article 2(a); available at www.unog.ch/archives/vienna/vien_69.htm)

Treaty-making on environmental issues has developed into a widely-used practice, largely because individual states tend to resort to multilateralism in addressing global problems. Interestingly, almost all of the multilateral environmental agreements (MEAs) negotiated in recent years have seen participation of an unprecedented number of states. For example, the 1985 Vienna Convention and the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer have been ratified by 195 states; the 1992 Framework Convention and the 1997 Kyoto Protocol on Climate Change have been ratified by 192 and 187 states respectively; the 1992 Convention on Biological Diversity has been ratified by 191 states and so on. Still, in view of the very nature of these negotiations and the fact that a large majority of states participate, the sense of negotiating MEAs still remains a matter of debate (Sand 1999). The subject matter of MEAs ranges from issues such as the protection of a species or flora and fauna in general, as in the Convention on International Trade in Endangered Species, to cultural and heritage sites, and the regulation of trade of hazardous chemicals and wastes, air pollution, and persistent organic pollutants, to issues of more global concern, like ozone depletion, climate change, biodiversity, and so on. The MEAs on a host of these issues have, in fact, changed over time, just as political, economic, social, and technological conditions have changed over time (Weiss 1998).

Acronyms and Abbreviations

CBD	Convention on Biological Diversity
COP	Conference of the Parties
FAO	Food and Agriculture Organisation
HKH	Hindu Kush-Himalayas
ICIMOD	International Centre for Integrated Mountain Development
IUCN	International Union for Conservation of Nature
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
TAR	Tibet Autonomous Region
UNESCO	United Nations Education, Scientific, and Cultural Organisation

About ICIMOD

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





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