

International Mountain Biodiversity Conference

Biodiversity Conservation and Management for Enhanced Ecosystem Services: Responding to the Challenges of Global Change

16-18 November 2008, ICIMOD Headquarters, Kathmandu, Nepal

Background

Mountains are among the most fragile environments on earth but, at the same time, are also rich repositories of biodiversity and ecosystem services, and the sources of much of the water that sustains life on the planet. The influence that mountain ecosystems exert on their neighbouring environments extends far beyond their geographical limits to encompass the surrounding lowlands dependent on them for goods and services. International recognition of the important role that mountain ecosystems play has received more attention since Agenda 21 (Chapter 13) was adopted at the Earth Summit in Rio de Janeiro in 1992 and since then the International Year of Mountains (2002) also helped to focus attention on the need for research and development efforts directed specifically at mountain ecosystems.

In spite of considerable international goodwill, mountain areas continue to face enormous pressures, the origins of which can be traced back to changes taking place globally. The direct drivers of environmental change in mountain areas include climate change, changes in land use/cover and species introduction/removal; while the indirect drivers include demographic, economic, and socio-political changes. Many of these drivers adversely affect biodiversity conservation, ecosystem services, and the well-being of the people whose lives and livelihood derives from the mountain areas. It is well-documented that land use/cover and climate change have already contributed to substantial species range contraction and extinctions; for the future, the consequence of human-induced climate change will likely endanger species persistence. While the first to be impacted will be the livelihoods of mountain people and the biodiversity of mountain species themselves, the effects will also eventually spread to the downstream river basins where they will have global ramifications.

Mountains are becoming a focus for conservation biology because of a growing recognition that the ecological conditions and rich biodiversity found there favour speciation and evolution. These fragile environments, which house some of the world's most threatened species, also house some of the world's poorest people, dependent on the biological resources that the mountain ecosystems afford. Mountainous countries have acknowledged the special status of mountain areas by setting aside 11.4% of their areas for protected area networks. The rationale for creating these protected areas has evolved as the understanding of the role they play has deepened; initially the focus was on conserving wilderness and uniqueness, and now the focus has shifted to their ability to preserve biodiversity, maintain cultural landscapes, and deliver ecological services.

Today there is an increasing appreciation of the service that the rich biodiversity that mountain areas render to the survival of humankind. In 1992, the Convention on Biological Diversity (CBD) put forth global objectives on the conservation of biological diversity, on the sustainable use of its components and on the fair and equitable sharing of the benefits arising from genetic resources. The Conference of Parties in 2004 adopted an 'ecosystem approach' to biodiversity conservation and management which included a programme of work on 'Mountain Biodiversity'. A recent advance in generating information and knowledge on mountain biodiversity complements these global agreements. The 'Mountain Biodiversity' programme aims to implement the CBD to reduce significantly the loss of mountain biological diversity by 2010 at global, regional, and national levels, with a view to alleviating poverty in mountain areas and in lowland areas that are dependent on mountain ecosystems for goods and services. These

programmes strive to remain relevant conservation initiatives by striking a balance between safeguarding biodiversity and encouraging development, and in doing so need to devise meaningful participatory approaches in both species and landscape conservation. The challenge of biodiversity conservation is especially demanding in ecosystem mosaics that cross national borders such as transboundary landscapes.

Globalisation and climate change are threatening biodiversity in even the most remote parts of the Himalayan mountains. As rain patterns change and the temperature increases, the unique plants that grow in this harsh environment may die out, threatening the animals and insects that depend on them, and the livelihoods of the mountain people who use them. There are many stories of change, and anecdotal evidence is abundant, but in this vast region, there is very little hard scientific information, information that is urgently needed so that appropriate actions can be planned to combat and limit the coming problems. A key problem is the alarming lack of systematic data for the Himalayan region, so much so that recently the Intergovernmental Panel on Climate Change (IPCC) the world's foremost authority on this subject, has considered the entire Himalayan region as a data gap area, or 'white spot', on the global climatic map. The eight countries that share the mountainous regions of the Hindu Kush-Himalayas have attempted to tackle the issue of data scarcity but since the response by global agencies has often been bilateral, it has been fragmented; perhaps better progress can be made by taking a regional approach. Global institutions can become better acquainted with the specific challenges shared by the mountainous regions of the countries of the HKH region by engaging regional institutions who have already synthesised the concerns of the member countries into the an in-depth understanding of the underlying issues. Both global and regional institutions stand to benefit from interacting more closely with each other and working together to share, exchange, and develop strategies with the aim of proposing comprehensive solutions to meet the challenges of global change in mountain areas.

Aims and Objectives

The objective of this meeting was to bring together global institutions involved in biodiversity conservation with regional groups familiar with the specific issues of the region. The aim was to share, network, and develop future strategies and alliances for mountain biodiversity conservation together, especially to meet the emerging challenges from climate change.

Inaugural Session

Welcome

Dr Andreas Schild, Director General, ICIMOD

Inaugural Speech: Biodiversity, Environmental Change and Regional Cooperation Initiatives in Hindu Kush-Himalaya
Prof Bruno Messerli, Dept. of Physical Geography, Univ. of Bern

Inaugural Keynote Speech: Biodiversity Conservation in a Changing World: An Overview
Prof Christian Körner, Dept. of Botany, Univ. of Basel

Message: Biodiversity Conservation and Management for Enhanced Ecosystem Services: Responding to the Challenges of Global Change
sent by Dr Ahmed Djoghla, Executive Secretary to the Convention on Biological Diversity

Inaugural Remark: Convention on Biological Diversity: Mountain Biodiversity Programme of Work and 2010 Targets
Mr Krishna C. Paudel, Joint Secretary, Min. of Forests and Soil Cons., Govt. of Nepal; Asia Pacific SBSTTA Bureau Member of CBD

MC: Dr Eklabya Sharma

Rapporteur: Ms Greta Rana

Participants to the Conference were from most of the major global and national programmes, universities, and regional member countries involved in biodiversity conservation and management.

In his inaugural welcome and presentation, the Director General of ICIMOD, Dr Andreas Schild, focused on the 'Himalayas-Source of Vital Resources and Growing Vulnerabilities.'

The Director General's PowerPoint presentation commenced by drawing the participants' attention to three crucial factors: the Himalayas are the third pole of the earth; they form an ecological buffer between the Tibetan Plateau and South Asia; and they are a source of fresh water with 10 major river systems providing a lifeline for over a third of humanity. The features of the Himalayas are that they are the location of major river basins and a centre of rich biodiversity. Currently there is uncertainty concerning the risks to the Himalayan ecosystem and beyond from climate change. Scientific uncertainty needs to be reduced; and yet, in the fourth report of the Intergovernmental Panel on Climate Change (IPCC), the Hindu Kush Himalayan (HKH) region is singled out as an area where sufficient data is not available.

The focus of ICIMOD's work was outlined: it is centred on water and hazard management; environmental change and ecosystem services; and sustainable livelihoods and poverty reduction. Activities include monitoring change, assessing resilience and adaptation; promoting payment for environmental services; disaster risk reduction; and capacity building.

The presentation closed with a brief on ICIMOD's expectations from its work: reduced vulnerability; increased regional ownership of the programme; science and research leading to the use of biodiversity resources as means of poverty reduction; and promotion of trans-Himalayan transects for longer-term monitoring to address the issue of consistent data generation from the HKH region.

Prof Bruno Messerli, Dept of Physical Geography, University of Bern, delivered the inaugural address, commencing by drawing participants' attention to the spectrum of topics covered by the conference and the need to examine them in the context of ongoing climate and environmental changes. The HKH extends 3,500 km and has variety of peoples and cultures, precipitation and climate patterns, and immense diversity in terms of landscapes and genetic resources. How could all the knowledge they offer be organised and improved upon; and how could mountain resources be preserved for highland-lowland benefit?

Prof Messerli presented a map containing the first draft of selected transboundary landscapes and north-south transects in the HKH. There were four transects and seven transboundary complexes open to the north; and through these Chinese researchers could assess and fully understand monsoon regime changes from the south to the Tibetan Plateau. He stressed the importance of knowledge about the climate, water, biodiversity, and ecosystem services in order to plan conservation and development strategies: it was essential to integrate this knowledge into the Global Climate Observing System (GCOS).

Prof Messerli stated that the HKH region is perceived as a 'white spot' because of the paucity of data on it, making modelling and projection difficult; hence, the importance of transboundary cooperation. Exhaustive cover would not be possible, but remote sensing (RS) methods and data from well-equipped sites could help in making projections. He proposed seven sites in which all the RMCs could be involved; these would be test sites where regional-scale information could be applied at the local scale and observations at the local scale could be used to ground-truth regional-scale information.

A GCOS table showing six of the HKH countries with stations above 1,000m was also presented and the hope was expressed that more stations were in the pipeline considering the importance of monitoring glaciers, snow cover, land cover, water, soil, and so forth. The speaker closed with an appeal for interaction and cooperation in the HKH by participation in global and regional programmes and downscaling experiences from them. He hoped that ICIMOD would take the lead in developing the transect approach and start monitoring soon with the active cooperation and participation of ICIMOD's RMC partners.

Prof Christian Körner of the Global Mountain Biodiversity Assessment (GMBA), Institute of Botany, University of Basel, spoke on 'Mountain Biodiversity in a Changing World: An Overview.' In his presentation Prof Körner highlighted mountain areas from several perspectives, in terms of total land area, forest, potential forest, mountain (mountain forest: 2 types), area above and below the tree line, and so on. Prof Körner pointed out that mountains influenced territory, especially river systems, far beyond their area and impacted half of the terrestrial surface. He went on to say that mountain terrain is rugged, and that area decreases with altitude but that mountain biodiversity is surprisingly

far greater than the limited land area leads one to expect. He pointed out that mountains are 'islands in the sky' that fragment habitat into mosaics, and that their slopes and topography influencing climate and vegetation.

A brief presentation was given on the work of GMBA-DIVERSITAS on geo-referenced databases. Among them were illustrations of International Sciences Institute (ISI) publications per country based on the keyword 'alpine', differences in land cover, the usefulness of key species in mitigating land degradation.

A key message given by the speaker was "Plausibility is not evidence," and "absence of facts needs to be addressed by reducing talking and increasing doing."

At this point, a message was read out from Dr Ahmed Djohlaf, Executive Secretary for the Convention on Biological Diversity (CBD). Dr Djohlaf apologised for his absence, which was due to previous commitments. See letter in Annex below.

The letter covered the importance of mountain ecosystems and the recognition by the same of the Conference of Parties (CoP) of CBD in 2004 during which they promoted a programme of work (PoW) on mountain biodiversity. In the International Year of Biodiversity (2010) the next CoP would be hosted by the Government of Japan. In May that year the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) would meet to review the progress of the PoW on Mountain Biological Diversity. It was recognised that the biodiversity of mountain areas was a crucial factor in meeting the Millennium Development Goals (MDGs).

The final speaker was Dr Krishna C. Paudel of the Government of Nepal's Department of Forests. His presentation was on Nepal's CBD programme on mountain biodiversity. He reiterated the important role of the mountains in the context of water supplies, cultures, genepools, and livelihoods. Specific examples were given of all these in his presentation: the importance of biodiversity in terms of species' richness, upland-lowland linkages, fragility, and so forth were also well illustrated.

Nepal's CBD programme placed emphasis on the reduction of loss of biodiversity, addressing threats, and promoting sustainability and the integrity of the mountain ecosystem. Mobilisation of resources and equitable sharing of benefits were also emphasised. The PoW of CBD had led to the Nepal Biodiversity Strategy in 2002, an Action Plan for from 2006-2011, and plans were being made for Wetlands and Wildlife.

The speaker closed by appealing for inputs for the CoP to be held in Japan in 2010 through the Secretariat at secretariat@cbd.in.

This concluded the inaugural session.

Plenary Session I: Central Issues and Concerns

Theme: Climate Change and its Implications for Mountain Biodiversity

Biodiversity in the Himalayas - Trends, Perception and Impacts of Climate Change

Dr Eklabya Sharma, Programme Manager, ECES, ICIMOD

Global Change in Mountain Regions - Strategies for Biosphere Reserves

Dr Thomas Schaaf, Chief of Ecological Sciences and Biodiversity Section, UNESCO's MAB Programme with its World Network of Biosphere Reserves, Division of Ecological and Earth Sciences, Paris, France

Chair: Dr Yuri Badenkov

Rapporteur: Dr Arun B. Shrestha

Dr Sharma's paper introduced the status of biodiversity conservation in the HKH region. The need to link conservation with people and development was adequately stressed but, despite the existence of a legal framework, it has not materialised in real practice. The presentation then dealt with the climate trends observed in the Eastern Himalayas and the implications they might have on habitat shift. Examples were given of keystone species, e.g., *Rhododendrons* and *Alnus nepalensis*, which might be affected by climate change. Lastly, the presentation put forward the concept of transects and of landscape approaches. Altogether four transects were proposed

representing different geoclimatic zones and latitudinal variations. It was pointed out that transects also served as a framework for transboundary cooperation in biodiversity conservation.

Dr Schaaf's paper provided detailed information about the Biosphere Reserve Programme of UNESCO MAB. An overview of biosphere reserve (BR) sites around the globe (530 sites) and particularly in the HKH region was provided. It was mentioned that the number of biosphere reserves in the HKH region was very small. The basic criteria for what a biosphere reserve should possess and functions of biosphere reserves were clarified. A typical structure of a biosphere reserve and some examples of biosphere reserves were provided. The presentation urged the establishment of additional biosphere reserves in the HKH region. It was mentioned that biosphere reserve sites in the HKH region could attract additional funding opportunities for the programme.

Discussion

Dr Gregory Greenwood put forward a question to all HKH participants: what could be the linkage between the cryosphere workshop (held in July 2008) and the present conference? He mentioned that the cryosphere workshop was able to produce a clear and compelling narrative of the understanding and gaps in cryospheric processes and asked what could be the narrative of the present workshop. Dr Greenwood added that, from his recent hike in Nepal, he did not notice anything 'bad' happening in the mountains.

Prof Ramakrishnan responded that charismatic species are important to us (scientists) but not to people in general; and yet the focus of the discussions (in this conference) is the common people. He stated that there are enough species which play important roles in conservation of biodiversity as well as supporting livelihoods.

Prof Bruno Messerli asked Dr Thomas Schaaf why there were so few biosphere reserves in the Himalayas and mentioned this as a disparity. Dr Schaaf responded that this is indeed astonishing, compared to the Andes for example. He was optimistic that Nepal would propose a BR site in the near future. He mentioned that India has come out strongly on this issue and already has one site – Nanda Devi – and is proposing another potential site in Sikkim. China has also been active in this respect, but there have been no concrete initiatives from Bhutan and Bangladesh as yet whereas, in Pakistan, the Kalash Valley is being considered as a potential site for a BR. Thomas Schaaf added that a BR site could attract additional funding from the Global Environment Fund (GEF) as BR sites go through stringent selection processes.

Prof Christian Körner stressed that 'plausible' should not be mistaken for real evidence and urged that hard evidence be sought. He mentioned that biologically diverse landscapes are often manmade landscapes.

Prof Martin Price, referring to Dr Greenwood's comment, mentioned that small species are most impacted by climate and environmental changes, but this is often unnoticed. Nevertheless, these species, as opposed to charismatic species, are more important to people. He reiterated that the discussion was about biodiversity for people.

Dr Ashiq Ahmad Khan mentioned that, in the early 1990s, the emphasis had been on protecting keystone species. He mentioned a law in the mountain communities of Pakistan where taxes from the richer areas were channelled to the poorer areas for the protection of wildlife. He told participants about the success that sites originally established for trophy hunting had eventually had for the conservation of biodiversity. He suggested that sites used for trophy hunting could serve as excellent biosphere sites.

Dr L.M.S. Palni stated that India already has a number of mountain biosphere reserves including one in a cold desert area in India as national initiative, however the one BR recognized by UNESCO is the Nanda Devi BR. He informed participants that the use of proxy data, such as data from dendrochronology (tree-ring chronology), could be a good way of overcoming the problem of data paucity.

Dr Falk Huettmann said that the lack of BR sites in the mountains is due to the selective approach of UNESCO.

Dr Khairul Alam suggested that the Montreal Protocol provided a funding mechanism and it could be useful for the BR programme. He expressed the idea that there should be a mechanism for energy-intensive communities to contribute to less energy-intensive communities.

Dr Thomas Schaaf appreciated the suggestion by Dr Khairul Alam and responded (to Dr Huettmann) by saying that UNESCO does not designate BR sites. The proposal has to come from the government to UNESCO and it has to

be discussed and approved. Prof Christian Körner added that UNESCO has the sovereignty to acknowledge the proposed BR sites. Dr Thomas Schaaf stated that the International Advisory Committee makes decisions and not UNESCO; it makes sure that the three prerequisites are met.

The Chairperson, in his concluding remarks, mentioned that the two presentations were proposing well-known approaches developed in the 1980s and stressed that the approaches should be combined for good synergy. He expressed the need to link biodiversity conservation in the Altai-Sayan ecoregion to the Tianshan and then into the HKH. He touched upon the deliberations of the Madrid conference in BR. A message from Prof Emeritus Dr Larry Hamilton, concerning biodiversity conservation was delivered. In connection with connectivity, he urged the participants to think big, think bio-regionally, think even on a continental scale, and think outside the box!

Plenary Session II: Central Issues and Concerns

Theme: Biodiversity Management for Economic Goods and Ecosystem Services from the Mountains

Biodiversity Goods and Services – Increasing Benefits for Mountain Communities

Dr Robert Zomer, ECES, ICIMOD, Kathmandu, Nepal

Ecosystem Services Arising from Biodiversity

Prof Palayanoor S. Ramakrishnan, INSA Honorary Senior Scientist, Jawaharlal Nehru University, School of Environmental Sciences, New Delhi, India

Chair: Prof Martin Price

Rapporteur: Dr Isabelle Providoli

Dr Zomer addressed the increasing benefits for mountain communities from ecosystem services at local, regional, and global levels, elaborating on the roles of mountain communities and cultural diversity for maintaining biodiversity. Mountain farmers are stewards of genetic heritage and resources within both managed and semi-managed landscapes. He highlighted the following types of useful biodiversity fulfilling a multitude of needs.

- Flora, fauna, multipurpose trees, pollinators, medicinal insects
- Agrobiodiversity

Communities suffer when biodiversity resources are degraded. Drivers of degradation include poverty, poorly managed subsistence activities, population, urban growth, roads, commercial exploitation, resource extraction, unsustainable tourism, globalization, and global change.

With regard to payment for ecosystem services (PES) and upstream-downstream linkages, opportunities directly result from biodiversity conservation. As examples, Dr Zomer mentioned watershed services for the most part.

- Quality / quantity of water, e.g. China – Green for Grain
- India, e.g., large payments to mountain states
- China – rangelands, e.g, payments to reduce herd sizes

Still outstanding issues on PES are valuation of ecosystem services (ES), identifying provision of additional ES (indicators – quantification of ES), appropriate agreements, institutional framework, implementation and monitoring, equitable distribution of benefits, and transparency and governance.

Existing global climate change frameworks on carbon, greenhouse gases (GHG), forests and, biodiversity include the following:

The United Nations Framework Convention on Climate Change (UNFCCC) - Climate Change Mitigation

- Kyoto protocol 2008-2012
 - GHG emission reduction targets
 - Land-use, land-use change, and forestry (LULUCF)
 - Clean development mechanisms(CDM) – afforestation – reforestation

Reducing Emissions from Deforestation and (Forest) Degradation (REDD)

- The Stern Review (2006) emphasised inclusion of the prevention of deforestation as a key element in any future international climate frameworks.
- UNFCCC Conference of Parties (CoP) 15 – Copenhagen - 2009
- Post-Kyoto Framework – after 2012

ICIMOD - HKH and REDD

- Development of a Mountain REDD agenda
- Mountains have very different (and heterogeneous) conditions: biophysical, socioeconomic, and institutional.
- Methods and approaches applicable in lowland forests may not be applicable in the mountains – and they are data sparse.
- The unique conditions and challenges of the mountains need to be highlighted in the international policy arena to articulate the need for REDD policies relevant to the mountains and to the HKH.

Prof Ramakrishnan highlighted the importance of interdisciplinarity between the bio-physical and social dimension in his presentation “from ecosystems to socio-ecological systems.” He emphasised the understanding of mutually supportive dynamics existing between cultural diversity and linked biological diversity, with implications for community-centred sustainable developmental pathways. Biodiversity links knowledge systems and is the key to addressing sustainability concerns, especially through participatory approaches based on community ‘knowledge systems’.

Traditional ecological knowledge (TEK) is an economic, ecological and ethical process. Prof Ramakrishnan described some examples and case studies from India in order to discuss and highlight the sustainable landscape management approach. To conclude, he presented adaptive management, which entails participatory problem-solving and empowerment of all stakeholders.

Discussion

During the discussion, some issues were raised which were later on discussed during group work.

- PES / biological corridors
- How to make biological corridors visible?
- How to pay poor / local people to maintain biodiversity?
- How to engage downstream sectors in carbon payments?
- PES, carbon issues, and CDM need reality checks.

CDM (Clean Development Mechanism)

- Issue of source and sink, internal and external costs.

Mountain agriculture

- Mountain agrobiodiversity, e.g., India –subsistence agriculture in the mountains. Subsistence – sustainable agriculture: How to transform subsistence agriculture into commercial agriculture including organic production?

Poverty and climate change

- Statement: poverty is not responsible for landscape decline. There is a danger of interlinking poverty, biodiversity, and climate change and each case should be considered separately.
- Biodiversity has physical, social, cultural, and economic factors.
- The question remains how to respond to global challenges at local level.
- In the HKH the relationship between poverty and biodiversity is not clear. Therefore a transdisciplinary approach, including local people and which either can be bottom-up or top-down is needed.

Plenary Session III: Central Issues and Concerns

Theme: Institutionalizing Long-Term Continuity in Mountain Research Programmes

Hindu Kush-Himalaya - Current Status, Challenges & Possible Framework

Prof Ram Prasad Chaudhary, Central Dept. of Botany, Tribhuvan Univ., Kirtipur, Kathmandu, Nepal

Global Change in Mountain Regions: Research Strategy and its Implementation

Dr Gregory Greenwood, Director, Décanat, Faculté des Géosciences et de l'Environnement, Switzerland

A Global Long-Term Observation System for Mountain Biodiversity – Lessons Learned and Upcoming Challenges

Prof Harald Pauli, GLORIA: The Global Observation Research Initiative in Alpine Environments, Dept. of Conservation Biology, Vegetation and Landscape Ecology, Univ. of Vienna, Austria

Chair: Dr Uday R.Sharma

Rapporteur: Dr Mats Eriksson

Three presentations were made at the plenary session highlighting 'current status, challenges, and possible framework', the Global Observation Research Initiative in Alpine Environments (GLORIA) research framework and the Global Change in Mountain Regions (GLOCHAMORE) and related research frameworks.

The discussion became more of a questions and answers' session, with 11 questions posed to the presenters, to which they subsequently responded.

The issues touched upon largely evolved around the stakeholders who are, or will be, part of a more concerted long-term research programme. It is obvious that researchers themselves have the strongest stake, but several questions focused on the management level: what is the rationale for managers to become more closely involved in a mountain biodiversity agenda? It was concluded that the managers' group is sometimes difficult to reach and more and improved efforts need to be made. It was acknowledged that interest often follows funding: whenever funding is available the discussions and involvement of different groups are realised. The role of the beneficiaries was also discussed: who are they and how are they getting involved? One group of beneficiaries is at the grass-root level, and this brings the question of dissemination into focus: how are research results and new knowledge made available to those who are in need of them and can put them to use?

The session was summarised by the Chair, Dr Uday R. Sharma, who concluded with the following points.

- Research should be structured.
- Research should be interdisciplinary in the HKH Region and should be supported by governments and local people.
- Dissemination of results is very important.
- How can the research be linked to livelihoods and poverty alleviation? What is in it for the poor?
- How can the interest and ownership at national level be ensured? How interest and ownership are ensured and how dissemination is taking place should be spelled out and highlighted.

Technical Working Groups (Parallel sessions)

The conferees participated in one of five parallel 'working group' sessions on sub-themes in which they were asked to share their HKH regional experiences.

Group I - Theme: Climate Change Impacts on Biodiversity and Mountain PAs

Chair: Prof P. S. Ramakrishnan

Rapporteur: Dr Yan Zhaoli

Prof Ramakrishnan welcomed participants to the group and introduced the , and contributions to the topic and scope for discussion were given by Prof Christian Körner and others. The agenda had two presentations and a focused discussion on how climate change incidences were affecting mountain biodiversity.

The first presentation was an account of climate change from the World Wide Fund for Nature (WWF) Nepal and it was given by Dr Ghanashyam Gurung. The evidence for climate change included rising temperatures in Nepal (the higher the altitude the more rapid the increases), melting glaciers and threats to populations downstream, and increasing occurrence of natural disasters. WWF Nepal worked in various areas to minimise the impacts of climate change: building networks and partnerships, raising awareness, detecting and modelling changes, drafting a national climate change policy, identifying alternative energy options, and prioritising opportunities for negotiation and action.

The second presentation was about the impacts of climate change and coping strategies in Nanda Devi Biosphere Reserve. Dr R. K. Maikhuri from the GB Pant Institute stated that climate change impacts on mountain biodiversity were seen in agriculture, pasture, forests and timberline vegetation, alpine meadows, and so on. These impacts had consequences for human activities such as tourism and intensive harvesting of high-value mountain products. In the central Himalayas, local people's perceptions about climate change were mainly confined to warming and increased variability of rainfall. He also reported that coping mechanisms in the mountains included eco-tourism, cultivation of medicinal plants, and use of pack animals.

Discussion

Following the two presentations, questions were asked of the two presenters, but these questions went far beyond the presentations with contributions from other group members and lots of interaction. All the group members, Prof Christian Körner in particular, actively contributed their expertise to the discussion. Group members agreed that research data and publications defining exactly how climate change is taking place in the mountains and what are the differences from the plains were unavailable. From fragmented information, however, evidence of climate change could be seen from rising temperatures, changing rainfall patterns, melting of glaciers and permafrost, increasing aridity, drying up of wetlands, and reduced water supplies and an increase in water-induced disasters. The interesting point was that diverse mountain topography might mean the mountains were more adaptable to change, because change can go upwards and around the mountains.

The impacts of climate change on mountain biodiversity are not easily decipherable due to lots of uncertainties and the other drivers contributing to changes and their interactions. Nonetheless, there are still obvious impacts: plant succession in the last 150 years was quicker than ever before with faster regeneration; little mountain caps and some species are disappearing in Australia; there are changes in the habitats of wildlife and plant species with a general trend towards moving upwards (such as tigers being found at higher altitudes or exotic plant species invading alpine ecosystems); and loss/reduction of keystone species especially in changed environments such as drying highland wetlands. Water regime changes brought about by climate change might have greater impacts on biodiversity and people's livelihoods than climate change itself.

Climate change affects various biological resources in different ways. When change happens, species that are fast to respond will survive but life forms with narrow niches might disappear. Generally speaking, vegetation is more affected by climate change than animals, because vegetation cannot move. When suitable habitat spaces shrink in response to climate change, this favours competitive species, but many species in the mountains (especially the high mountains of the HKH region) are selective in terms of their environment and have narrow niches.

Protected areas contain only a fraction of mountain ecosystems. The smaller the protected area is, the more vulnerable it will be to climate change. Therefore, the suggestion is to design large protected areas with flexible boundaries (boundaries could be changed seasonally or as per the need). In many cases, corridors and transboundary protected areas should be established to assure sufficient area and connectivity for effective biodiversity conservation.

Protected areas, however, should not destroy livelihoods. Mountain people might not worry too much about the loss of biodiversity or keystone species, but their reactions to changes in land-use patterns, decisions about livestock management, new livelihood options, and migration interplay with the richness of biodiversity and effectiveness of conservation. Therefore, mobilising and involving people within and near protected areas is a key factor in conserving biodiversity. Carbon trade and payment for ecosystem services are potential opportunities for involving local people.

Group II - Theme: Land Use Change Trends and Impact on Mountain Biodiversity

Chair: Dr Daniel B. Fagre

Rapporteur: Birendra Bajracharya

Prof Xu presented the state of land cover/ land use in the Himalayas and stated that urbanisation was a slow process and the climate a long-term driver for change. Historical evidence and an integrated framework would be needed to understand change. An example from the Tarim Basin showed that the rangeland pattern shifted with changes in glaciers. Similarly, the variability of the Asian monsoon always had a strong effect on food production in China, and this could be traced back to 190 AD and the fall of Chinese dynasties being correlated with weaker monsoons. He described the five Chinese elements– gold, land, energy/ fire, water, and wood– and the balance between them which is believed to be important for a harmonious ecosystem.

Major causes of land-cover change in different geographical and historical contexts were identified as changes in the livelihoods of nomads in highland rangelands; forest transition due to plantation and agroforestry; agricultural intensification; and tropical forest and lowland plantation economies. There were also impacts of hydrological responses to land-use/cover and climate changes. These impacts were illustrated through giving examples of rubber plantations and agroforestry policies. Prof Xu attributed the regional pathways of land-use change to a new generation of traditional nomads, agropastoralists, and shifting cultivators whose livelihood patterns are changing, and interactions between different actors, between the highlands and lowlands, and between management decisions and policies. The alternative pathways contributing to sustainability of mountain ecosystems were identified as payment for ecosystem services, agroforestry, and sustainable forest management for carbon, biodiversity, and water-related ecosystem services. It was emphasised that policy support is essential and decision makers should not be forgotten.

During specific discussions on the presentation, Prof Martin Price commented that taking changes experienced in China as a mean in forest transition might not give a true picture when one considered the vastness of the country. Forest transition is a big topic of debate and actual functional aspects should be examined as forest biomass and density are not the same.

Dr Spehn presented land-use change and mountain biodiversity from a global perspective by giving examples from a number of Global Mountain Biodiversity Assessment (GMBA) research findings. The land-use changes that reduce mountain biodiversity are mainly cultivation of formerly pristine areas; intensification of agriculture/husbandry in montane areas; and abandonment of formerly grazed montane and alpine grasslands. The research agenda of GMBA on land-use change was presented with research examples from the European Alps, Caucasus, and Himalayas. The research questions focused specifically on use of highland vegetation and husbandry systems; fire ecology; highland cropping, hunting and gathering and medicinal plants; regeneration; and cross-cutting research issues on hydrology and erosion; interactions of land use with climate change; and indigenous knowledge. The Kilimanjaro study looked into the effects of forest fire on biodiversity and ecosystem functioning. The study in the Himalayas looked into the effects of grazing. It was found that moderate grazing increased species' diversity and that impact is low in the case of highland grasslands unless grazing rates are very high. Selection of less palatable species and appropriate animal selection helps in management of loss due to grazing. The studies and findings are synthesised in 'Eva M. Spehn, Christian Körner and Maximo Liberman (eds.) – Land Use Change and Mountain Biodiversity, Taylor and Francis'.

Prof Martin Price suggested that it is necessary to look at the whole picture of forest, agriculture, and grazing land. There were comments that some systems required fire to increase biodiversity, but it depended upon the frequency of burning. Similarly, the impact of abandonment also depended upon where pastures were and for how long they had been abandoned.

Discussion

The points raised during discussion are summarised below.

No information is available on the overall trend of land-cover/ land-use changes in the Himalayas.

There is a need to look at the definitions of land use and land cover as these will lead to different interpretations of change. Land use and land cover are linked, but they are separate concepts.

- Assessing land-use change and its impact on biodiversity is scale dependent.
- On the largest scale, there can be such intense land-use and land-cover changes (LULCC) that minimum habitat and population of organisms can suffer negative impacts and mountain biodiversity can be reduced.
- On intermediate and local scales, LULCC is site specific, dependent on history, national policies, and upon whether natural mountain biodiversity, agricultural biodiversity, or functional biodiversity are being measured. On these scales, LULCC can have both positive and negative impacts.
- Large habitats and connectivity are matters for large species and usually managed by governments, but farmers' landholdings, home garden management, and small-scale biodiversity species, such as keystone species, should also be taken into account. Similarly, underground biodiversity such as fungi and bacteria should not be forgotten as they support productivity above ground.
- Policy plays an important role in bringing about LULCC. The Chinese government considers introducing rubber plantations and forests as conservation measures, but monocultural plantation is not good for biodiversity, fire, and water regimes.
- Fire is used by herders to increase grass cover, but policies do not permit burning of grasslands. Conflicting policies of different government departments sometimes drive different LULCC (e.g., promotion of plantation by the forest department and promotion of horticulture by departments of agriculture).

Example - 30 years ago poplars were planted in Kashmir to meet timber requirements, but this changed the moisture in the atmosphere and introduced fungus into apple plantations.

Example - Scottish forestation was intended to meet the demand for fuelwood by coal mines during the Second World War, but the spin-off is that now there is an abundance of mushrooms in the forested areas and they are a very big mountain product.

Example – Chittagong Hill Tracts – the land-tenure system is causing changes in land use

- Livelihood and ecological processes needs to be looked at together. It is important to see how management affects biodiversity and ecosystem functions such as slope stability and water supplies. Habitat degradation and fragmentation cause conflict between human and wildlife populations, e.g., elephants in India and Nepal.
Example – In upper Mustang, less snow in recent years has resulted in a decrease in fodder, resulting in fewer animals being raised and less dung for cooking: this in turn has led to an increase in collection of wood from the scarce forest resources.
- We need compelling narratives that motivate programmes from funding agencies.
Example – the narrative 25 years before about intensification of land use in the middle Himalayas increasing landslides and floods in Bangladesh provided a lot of impetus.
Example – the recent glacier studies, which are plausible although not proved, have drawn attention to climate change.
- We should not assume too much, however, the example of shifting cultivation in the Eastern Himalayas shows us that many assumptions are incorrect.

The Himalayan Region is so diverse and we need stories for each area which factor in history and policy but avoid generalisation. We should not look vertically above and below the tree lines only but also at eastern and western areas which are very different.

Group III - Theme: Wetland Ecosystem Functions and Services – Implications of Climate Change

Chair: Dr Chris Baker

Rapporteur: Mr Pradeep Mool

There was one presentation by Chaman L. Trisal from Wetlands International – South Asia on 'Wetlands of the Hindu Kush Himalayas - Ecosystem Functions, Services and Impacts of Climate Change'. The presentation was followed by a short video clip of about seven minutes duration on issues related to the wetlands and climate change in the Wular Lake's Jhelum Basin area.

The presentation highlighted key issues concerning wetlands in the HKH region. The speaker stated that wetlands accounted for about 17% of the area of the region which was the source of ten major Asian rivers, supporting 29% of the global population. The importance of some ecosystem services was discussed in the presentation.

Carbon sequestration: for example, Ruoergai marshes in China stored 750 million tonnes of carbon – 7.5 times the annual fossil fuel emissions of the Chinese transportation sector.

Hotspots of biodiversity: for example, Bar-headed geese used the voer (creek) marshes and high-altitude wetlands (HAWs) of Bhutan as breeding grounds; along the rivers of Kashmir – high-altitude wetlands provided cold-water habitats for fish (trout). Cultural linkages and support to livelihoods: for example, Ruoergai marshes supported more than 50,000 Tibetan herders, and several high-altitude wetlands, such as Gokyo in Nepal, were of religious and spiritual significance, especially for Hindus and Buddhists.

Water diversions, drainage for agriculture, overgrazing, and stresses induced by climate change were leading to degradation and contributing to a wide range of human- and environment-driven threats. Significant changes had occurred as a result of climate change in the Himalayan Region, and these would result in rapid increases in glacial melt, which contributed 4 – 45% of the river base flows– increased variability of flows, and frequent droughts and floods.

Shifts in biodiversity – this rendered species with restricted habitats vulnerable and would lead to high levels of vulnerability within communities. Wetland vulnerability in turn would increase vulnerability to climate change. There was also an adaptive role wetlands could play in contributing to climate change as they could provide services to regulate hydrological regimes – storing peak flows, augmenting lean flows, and storing carbon – peatlands, and supporting biodiversity.

The example of wetlands in the Wular Lake Basin of the Kashmir Valley in Jhelum Basin was given. About seventy per cent of the area was originally marshland and was converted to agricultural and plantation land from 1911 to 2007. An analysis of river discharge data (from the past 100 years) showed higher flow volumes and earlier onset of high flows due to increasing glacial melt in the Jhelum Basin. This would lead to increased vulnerability of downstream areas with floods and droughts and loss of wetlands. Poverty and marginalisation of communities in the lake area because of degradation of the lake were considerable. The percentage of population below poverty line had increased significantly compared to the state of Jammu and Kashmir as a whole.

A management package for wetlands and river basins was necessary to integrate wetlands into climate-change adaptation measures. The following factors needed to be considered:

- the functioning of high-altitude wetlands is considered critical to ensure sustained provision of ecosystem services to the downstream reaches;
- wetland conservation and wise use as alternatives to structural approaches; and
- the connectivity of wetlands to river systems is critical for maintenance of ecosystem services.

The following points were also raised.

1. The current status of policy integration for biodiversity and water regimes is that a sectoral approach to wetlands and water management is used with a limited degree of integration.
2. The role of wetlands in water management and river- basin management is not explicitly recognised.
3. Water allocation strategies are focused on human needs without considering ecological requirements.
4. The principal focus in management of water resources is on the role of the state and community institutions – the private sector's role is limited and incentive mechanisms diffused.
5. There is an urgent need for action as inadequate integration increases the vulnerability of large populations and ecosystems – especially on account of climate change.

The 'Himalayan Wetlands Initiative' was a regional initiative of the Ramsar Convention, initiated by regional member countries and other international organisations such as the International Centre for Integrated Mountain Development (ICIMOD), WWF, and Wetlands International (WI): it still needed endorsement by member countries. ICIMOD and other partners were coordinating this. The 'Himalayan Wetlands Initiative Strategy' for the conservation and wise use of Himalayan Wetlands was finalised recently by participants at the workshop (1-3 September 2008) in Kathmandu and the following areas were included.

1. Database methodologies for Himalayan Wetlands
2. Mechanisms and facilities for cooperation, networking, and capacity building
3. Improved knowledge of climate change impacts and adaptive responses
4. Devising and promoting best practices on Himalayan wetland management

5. Development of participatory communication, education, and awareness (CEPA) programmes
6. Development of policy support for implementation of wetland conservation

Discussion

The following issues emerged from the discussion following the presentation.

- High-altitude peatlands in China, such as the Ruogai marshes, were experiencing changes in water regimes as a result of rises in temperature, and this was causing a 47% reduction in river water regimes.
- Payment for ecosystem services for downstream benefits from upstream were already in practice in China in the high-altitude wetlands and rangelands to compensate herders for not controlling grazing.
- In the Chinese high-altitude peatlands, about 100 tons of carbon would be released if the water table on one hectare of land decreased by one metre.
- There had been negative impacts on some wetlands, such as Napa Lake in China, due to tourism, horse riding, and mining activities.
- Some lakes on the Qinghai - Tibet Plateau were shrinking and water sources needed assessing to find out whether they were rainfed or from glacial melt. This would make a significant difference in the response to climate change.
- The decrease in permafrost had resulted in a reduction in water reserves and wetlands by about 27% in the Yangtze and Yellow river headwaters in Qinghai.
- There was inadequate knowledge about the relationship between water management, climate change, and wetlands. Further research on hydrological data was needed to understand the water sources for wetlands and the climate patterns in HKH mountain areas. Siltation and debris were filling dams and reservoirs rapidly in HKH regions such as Pakistan.
- There could be a potential positive impact from climate change in the wetlands such as that from glacial melt. It should be recognised, however, that this would imply a change in wetland types.
- There were specific research gaps when it came to integration of wetland ecosystems into water, and linking research to policy to livelihoods and local knowledge meant better research.
- There was an example from Machu County in China where people were working together with researchers, policy makers, and local communities of herders to implement a system of ecological service payments.
- In Myanmar there was little information and an inventory of wetlands was needed: this could be put together in collaboration with Wetlands International and ICIMOD.
- Most infrastructures, such as dams and hydropower projects, disturbed the free migration and breeding of aquatic life: the aquatic life along the Irrawaddy River was one example.
- The 'Himalayan Wetlands Initiative' offered an opportunity to move from a fragmented national approach to a regional multidisciplinary approach with common methodologies for data collection and sharing.

Some key conclusions were drawn from the session.

- More integrated, multidisciplinary research would be essential to bring about wetland conservation and understand the relationship of wetlands to climate change.
- Practitioners and policy makers should be more engaged in setting research agendas and encouraging development agendas.
- Research should take into account relationships between communities and livelihoods.

Some key research issues were identified.

What is the role of high-altitude wetlands and especially peatlands in climate change mitigation?

- Is there a role for restored/maintained wetlands as tools in climate change adaptation?
- Payment for ecosystem services is an emerging tool to support wetland communities in conserving high-altitude wetlands. Research is needed to identify the best practices and these should be developed based on evaluation of current examples.
- More investment in data infrastructure and research for understanding the relationship between wetlands and water resources is needed.

During Plenary Session IV the Reporting of Group Work for this session raised the issue of the resilience of the biodiversity approach through introduction of valuable genes and species. The opportunity provided by the carbon sequestration dimension of the wetlands was also discussed and highlighted as a key area for future work.

Group IV - Theme: Balancing Biodiversity Conservation with Community Livelihoods

Chair: Prof RP Chaudhary

Rapporteur: Dr Brigitte Hoermann

Dr Libor Jansky from the United Nations University and Dr Thomas Schaaf from UNESCO gave presentations about how biodiversity conservation and community livelihoods can be balanced.

Dr Jansky referred to the Pamir-Alai Mountain project in Central Asia. The project's aims are to restore, sustain, and enhance the productive and protective functions of the transboundary ecosystem in order to improve the social and economic well-being of rural communities and households using the resources from the region's ecosystem for their sustenance, while preserving its unique landscape and globally important biodiversity. This distinct ecosystem hosts global values that face immediate threats. Endemic animal species are endangered because of overuse by local communities, habitat destruction, and international hunting activities, while endemic plant species are endangered as they are used as fuel substitutes. Overexploitation of grasslands is leading to pasture degradation. The overuse of biomass resources as fuel substitutes grew after the Soviet Union stopped the supply of fossil fuels and electricity. Further, the water towers and global carbon sinks were affected. To conserve ecological and cultural diversity, new adaptive land-use systems, such as irrigated and rainfed agriculture or transhumance livestock breeding, have to be identified in a participatory manner to increase capacity and create ownership of the local communities over their natural resources.

Dr Schaaf presented a global perspective on balancing biodiversity conservation with community livelihoods with examples from the United Nations Educational, Scientific and Cultural Organisation's (UNESCO) Biosphere Programme (MAB). UNESCO's 'Biosphere Reserve' concept was presented as a feasible and sustainable way of balancing biodiversity with community livelihoods. Biosphere reserves are areas that are internationally recognised for promoting and demonstrating a balanced relationship between people and nature, thereby combining conservation with sustainable development. For mountain areas, clear assets can be identified: they have spectacular scenery, a clean environment, rare and endangered species, and cultural uniqueness. These assets particularly favour tourism as a means of balancing biodiversity conservation with community livelihoods. With several examples of biospheres (BSP) around the world, different approaches to balance conservation and livelihoods have been used—ecotourism in the Issyk-Kul BSP, Kyrgyzstan; eco-lodges and organic food production in the Dana BSP, Jordan; licensing for protected biosphere products in Africa; and biospheres as a brand fetching premium prices in Switzerland. Further information is available at www.unesco.org/mab.

Discussion

The following sums up the key issues discussed by the participants.

- The longstanding debate that a balance between conservation and livelihoods is not possible was rejected on the basis of the participants' experiences throughout the HKH countries.
- The working group agreed that the conservation of biodiversity is a global responsibility as its loss will have global impacts.
- Degradation and loss of biodiversity have been identified to be principally a result of human impacts; therefore balancing of conservation and livelihoods is of utmost priority.
- As long as there are insufficient opportunities for earning livelihoods, the pressure on biodiversity cannot be eased. Any conservation programme must, therefore, also address livelihood options.
- Balancing conservation and livelihoods can only be successful if local communities are involved in conservation programmes. A sense of ownership for and understanding of the value of biodiversity among communities must be achieved. In addition, interventions should build on local culture, knowledge, and experience.
- Tourism is a very promising strategy for livelihoods in mountain areas; however, this is not applicable throughout the region. Other opportunities need to be identified or developed, and this is difficult for very remote and inaccessible mountain areas.
- Some participants argued that agrobiodiversity had been neglected during the conference and needed to be looked at more thoroughly. Agrobiodiversity is not only important in terms of food security in the mountains, but also crucial for conserving genes important for the global (research) community.
- Generalisations are difficult to make about ideal, sustainable livelihood options for communities. It is necessary to diversify, adapt, and blend traditional and modern technologies.

Group V - Theme: Biodiversity Transects and Transboundary Connectivity Approaches in Mountains for Long-term Monitoring and Regional Cooperation

Chair: Dr LMS Palni

Rapporteur: Dr Krishna Prasad Oli

Two presentations were made by Dr Nakul Chettri of the International Centre for Integrated Mountain Development (ICIMOD) and Dr Graeme Worboys, Chair of the World Commission on Protected Areas (WCPA) of the International Union for the Conservation of Nature (IUCN). Dr Chettri addressed the possibilities of developing and implementing biodiversity transects while Dr Worboys made a presentation on corridor connectivity approaches to link landscapes with protected areas and protected areas with fragmented landscapes.

In his presentation, Dr Chettri talked about the major challenges of conservation and development in the HKH Region. Challenges related to physical change include, inter alia, land degradation, land fragmentation, habitat fragmentation, and biosphere reserves and protected areas increasingly being turned into islands of conservation. There are direct and indirect drivers of change that are impacting ecosystem services and the wellbeing of people in the Himalayan region. In order to address the impact of different drivers, several institutions are working with local communities, on one hand, and with regional member countries on the other. This has resulted in development of momentum among participating countries, resulting in the promulgation of different policy frameworks for transboundary biodiversity management. Examples include the sacred Himalayan landscape in the Nepal- Bhutan biological corridor complex and the Terai arc landscape in Nepal. These initiatives are milestones in terms of enhancing transboundary biodiversity conservation. More transboundary landscapes have been identified in the Himalayan region by ICIMOD.

Although transboundary biodiversity conservation has been one of ICIMOD's main thrusts, in view of climate change issues, a new approach to transboundary biodiversity conservation research through the transects has been proposed. This concept includes extensive parts of entire ecosystems found within given latitudes and longitudes. This approach will examine the entire gamut of biophysical aspects as well as monitoring the drivers of climate change.

The second presentation was made by Dr Graeme Worboys on Connectivity Conservation Management (CCM). The major thrust of his presentation was how to develop corridor connectivity and retain interconnection between the natural land and people in response to climate change. This is a necessary measure in order to respond to global change and biodiversity and invest in ensuring the future of the earth. In mountain areas both culture and biological resources should be viewed in tandem as providing a basis for people's livelihoods. Therefore conserving the natural landscape, conserving habitats and their links, retaining connectors of the ecological evolutionary process, and managing major threats will facilitate adaptation in the face of climate change. The speaker indicated that protected areas and biosphere reserves are good ways of monitoring the effect of climate change and the best method of species' conservation because a network of nature reserves provides core habitats for many species in the transects. Landscape connectivity can promote biocultural conservation.

Several methods can be used for conservation connectivity. Currently, many national governments in the region have set aside protected areas and biosphere reserves where there are already bio links or ecological networks that can be strengthened by adopting the transect concept and vision as a method of conservation connectivity. In order to achieve connectivity conservation, a vision with three settings — nature settings, management settings, and people settings— was proposed. Natural settings include landscape connectivity, ecological connectivity, habitat connectivity, and evolutionary process connectivity. Similarly, management settings include policy legislation and information while people settings provide the life-support system.

Discussion

After the two presentations, participants discussed them and made the following recommendations.

The concepts of transect and landscape corridor connectivity were discussed. Key areas of discussion are given below.

Comprehensive list of species including lower taxa – In major biodiversity inventories prepared by authorities, ecologists, and others from national parks and protected areas, emphasis has been given to wildlife flagship species

and angiosperms whereas the lower taxa which play a significant role in maintaining transects or connectivity and enhancing the conservation of biological resources have been neglected. Therefore the biodiversity of the lower taxa should be documented also as they can act as indicator species.

Risk of having invasive species – Large areas in the HKH region are farmed. In such areas many species that were not endemic have been incidentally or intentionally introduced, and have colonised and dominated the native species. Active management is required to prevent their domination of indigenous species.

Technology transfer – Within HKH countries, there are several useful technologies that have been developed and have economic potential but which are not shared with other countries. These technologies have a great potential to improve livelihoods and should be shared among regional member countries (RMCs). Examples of such technologies are: harvesting musk from the musk deer without killing it and manufacturing seabuckthorn products. ICIMOD should promote the sharing process and help to transfer technologies to other countries that may need them.

Confidence building – Several times during discussions, it was emphasised that ICIMOD should be engaged in building confidence between various partners in the region. This is crucial for effective implementation of any transboundary biodiversity management programme.

Communication at different levels – Often decision and policy makers at different levels are unaware of how policies have been implemented and what the international and regional policies governing conservation of keystone species in the region are. In addition even national policies and laws are not clear within different government departments. Therefore a communication strategy is essential.

Dealing with uncertainties – The biggest problem in conservation and management of transborder biodiversity resources, in particular in mountain areas, is uncertainty in the face of climate change. What will happen is hard to forecast. Therefore, resilience methods and practices and resilient species need to be learned from local communities and important components identified for adoption in the face of uncertainty.

Databases – Data on the climate and biodiversity are available in different countries, but they are not shared with others and their use has not benefited transboundary biodiversity conservation processes. The group felt that data needed to be generated using existing databases as a starting point. This means making fresh commitments to regional data sharing and establishing a regional clearing-house mechanism (CHM).

Clarification of the concepts – Since the concepts of corridor, landscape connectivity, and transects are new to many RMCs in the HKH region, it is important to make it clear what these terms actually mean to the stakeholders concerned.

The discussion points outlined above led to some recommendations for improving transboundary corridor conservation, developing corridor connectivity, and adopting transects as one of the concepts for transboundary biodiversity conservation and monitoring and improving livelihood options.

Recommendations

- The group decided to promote the concept of transects for transboundary biodiversity conservation, landscape, and corridor connectivity development. This, however, needs to be made conceptually clear and shared among participating countries.
- Any policy development (including framework or guidelines) on transects needs to be simple and location specific. Policies should be developed in collaboration or in conformity with the partners and their national policies (for example, India has recently announced a national mission on sustaining the Himalayan ecosystem and has commitment at the highest level).
- In order to develop the concept and framework of transects and corridor connectivity and to develop a cooperative framework, the group recommended that an internal multi-disciplinary team should be formed in ICIMOD to develop the concept, share it with a select group of participant from this conference, and stakeholders, and then recommend a methodology for implementation.

Plenary Session IV: Reporting of Group Work

During this plenary, the facilitators for the group discussions on the five sub-themes summarised the discussions that took place in their groups on the HKH regional experience. The summaries were followed by a discussion, and question and answer session.

Chair: Dr Douglas McGuire

Rapporteur: Ms Brigitte Leduc

Group 1: Climate Change Impacts on Biodiversity and Mountain PAs

Discussion

Evidence of climate change

- It is happening; warming effects are felt.
- There are changes in precipitation.
- It is drier in winter and in the dry season.
- There are benefits from changes in the middle mountains.
- Scarcity of water resources is increasing.

Impacts of climate change

- Pastoral species survive better.
- Vegetative species are more at risk than animal species (they cannot move).
- The habitats of many species are shrinking, species in the Himalayas very much affected.

Implications for PAs

- Feasibility of moving boundaries
- Flexible barriers for PAs to benefit protected areas
- Coping mechanisms for people – alternative livelihoods, migration
- Conservation and functions (for livelihoods) - both have rights

Questions and Answers

Q. Did the group discuss how much information we have or do not have: how much do we know about climate change? And how much do we know about where species are?

A. There is a lot of discussion, but the information is very patchy. Broad generalisations cannot be made at the regional level. There are human dimensions to be considered and measures have to be taken to protect as many resources as possible.

Many changes happen but not all changes are the results of climate change. We do not know to what extent climate change is having affects on the environment, it is difficult to evaluate. Variations in global changes affect the situation.

Q. Did you discuss what the key indicators are for monitoring biological changes?

A. We did not reach that point. In each PA some species are identified for measuring impacts of climate change because they are more vulnerable to it.

Group 2: Land-use Change Trends and Impacts on Mountain Biodiversity

Discussion

- Livelihood and ecological processes needs to be looked at jointly.
- Disconnected and/or conflicting policies
- Examine the eastern and western Himalayas apart from above and below tree lines.

Questions and Answers

Comment: Land-use changes: the composition of livestock has changed in Leach and this has an impact on land use.

Comment: One thing is missing: fragmentation of habitat, wildlife disappearing: human and animal conflict is rising – elephants and monkeys conflict with humans in Bangladesh

Comment: Pamir Alai – we cannot change anything: the land is changing us because it is degrading too rapidly.

Biodiversity is disappearing: people's survival is challenged. Different approaches are needed for different mountain contexts.

Group 3: Wetland Ecosystem Functions and Services – Implications of Climate Change

Discussion

- Wetlands always influence the water regime
- How do we link ecosystem services, wetlands, and climate change - the knowledge gap is important.
- There is evidence of climate change in some regions.
- Experiences and observation should be shared among different countries in the region.
- Resilience of ecosystems and the people
- How to restore wetlands
- Payments for ecosystem services – a lot of research needed to show if it is really working because nobody monitors.
- There is no inventory of wetlands in Myanmar.
- To fill research gaps more efficiently interdisciplinary research is needed.
- Research has to be linked with the real world and to the policy/ decision makers who should participate in setting the research agenda
- A framework should be put in place for research into different dimensions of the wetlands.

Questions and Answers

Q. Comment on resilience: systems are not resilient.

A. The talk is more about ecosystem levels than about specific species.

Q. The carbon dimension of pit lands is disappearing: it is important to consider this.

A. This was not discussed much during group work, but our institution has started working on that. Link with the programme on Reducing Emissions from Deforestation and Degradation (REDD). There is a lack of understanding about this.

Group 4: Balancing Biodiversity Conservation with Community Livelihoods

Discussion

- Can humans achieve a balance with nature? Debates at international level.
- Since it is people's livelihoods that challenge natural resources, it is people's livelihoods that have to be adapted for conservation.
- There is no universal answer to whether livelihoods can be balanced for biodiversity conservation: there is great diversity.
- Conflicts between culture and animal protection
- Loss of agricultural biodiversity because of commercial agriculture
- Ecotourism as an alternative livelihood in some regions
- Use of medicinal and aromatic plants (MAPs) and non-timber forest products (NTFPs)
- Branding agrobiodiversity products
- Organic agriculture is mentioned but is it possible in poor countries?
- Diversified approaches are necessary.
- Water needs should be addressed.

- Community-driven and resource ownership: conservation initiatives work better.
- Supporting policies and institutions is necessary.
- Livelihoods and conservation cannot achieve balance themselves.
- Market changes, technology changes, and climate changes – all influence the situation.
- An interdisciplinary approach is necessary to address conservation issues.
- The concept of agro-biodiversity has been discussed.

Group 5: Biodiversity Transects and Transboundary Connectivity Approaches Long-Term Monitoring and Regional Cooperation in the Mountains

Discussion

- Dealing with uncertainties: support resilience and adaptive practices.
- Do not spend too much time on research – the need for intervention is urgent.
- Instead of spending too much time on building something new, it is better to build on existing practices.
- The concept and scale of corridor transects need to be clarified.

Recommendations

- The concept of transects must be taken forward.
- The framework needs to be simpler.
- A committee to monitor implementation is needed.

Questions and Answers

- Q. The Western and Eastern Himalayas meet – one of the richer areas for biodiversity: study this area. Think about community management of resources.
- A. There are significant differences between the western and eastern Himalayas, but there are a gap and transect approach which can help bridge the gap.
- A. Academic thinking – no dispute on the topics of transboundary and biodiversity transects. It needs a simple approach for implementation. The challenge is how to coordinate at the regional level. ICIMOD could work as a facilitator, notably in transfer of technologies.
- Q. How about a water basin approach for this transect approach?
- A. Water is a very political issue: we may not succeed using a river-basin approach for the transboundary approach.

From the Chair

- Suggestions need to be plausible.
- There is wide diversity in the region.
- A narrative is needed.
- An interdisciplinary approach is essential.
- More research is needed.
- Local communities have to be involved.

Plenary Session V: (Parts 1 and 2)

This plenary gave each of the global programmes an opportunity to respond to the HKH regional experiences by providing global perspectives and providing ideas and suggestions on how their particular programme could contribute. As the background papers on the global programmes had been previously circulated, the presenters were asked only to respond to the regional experiences. The global programmes discussed how they are presently involved in the HKH and how they intend to respond to the challenges of the region, what they see as a role for partners and how ICIMOD can be involved.

Plenary Session V (Part1): Responses from Global Programmes

Chair: Prof Bruno Messerli

Rapporteur: Dr Isabella Bassignana Khadka

Towards Addressing the Issues of Global Climate Change

Dr L. M. S. Palni (G B Pant Institute of Himalayan Environment and Development (GBPIHED))

Dr Palni presented the Prime Minister of India's recently announced 'Action Plan on Climate Change' which focuses on establishing an effective, cooperative, and equitable global approach based on the principle of common but differentiated responsibilities and respective capabilities, as enshrined in the United Nations Framework Convention on Climate Change (UNFCCC). The action plan highlights eight areas of action or 'national missions', namely: solar, enhanced energy efficiency, sustainable habitats, water, sustaining the Himalayan ecosystem, green India, sustainable agriculture, and strategic knowledge for climate change. The details can be found on the web page <http://pmlIndia.nic.in/>.

These eight national missions simultaneously focus on multiple fronts by promoting understanding of climate change, adaptation and mitigation, energy efficiency, and natural resource conservation. The Indian government is committed to achieving key goals through multi-pronged, long-term integrated strategies and effective and accelerated implementation of time-bound plans through change in direction and enhancement of scope.

Dr Palni pointed out that, of the eight missions outlined, seven are sectoral and only one is site specific, namely, the mission on 'sustaining the Himalayan ecosystem'. This mission will encompass evolving management measures for sustaining and safeguarding Himalayan glaciers and the mountain ecosystem. The four approaches to this include: 1) enhanced monitoring of the Himalayan ecosystem with a focus on recession of Himalayan glaciers and its impact on river systems; 2) establishing observation and monitoring networks to assess freshwater resources and ecosystem health; 3) promoting community-based management incentives for protection and enhancement of forested lands; and 4) strengthening regional cooperation by exchanging information with countries sharing the Himalayan ecology.

The mission on sustaining Himalayan ecosystems would focus on the principles laid out in the National Action Plan on Climate Change and would encompass: 1) protecting vulnerable sections of society through resource management and livelihood options; 2) enhancing ecological sustainability within disturbance regimes for native and endemic elements and for glaciers and river systems; and, lastly, 3) deploying technologies for hazard mitigation and disaster management, ideal human habitats and agriculture, and forest sector innovations.

The mission on sustaining Himalayan ecosystems would link with the other missions to achieve the goal in a holistic manner. Possible approaches incorporating many aspects include solar and micro-hydel energy, forest-based economies, watershed management and ideal Himalayan landscapes, eco-based tourism, protected unique landscapes, local organic agriculture, and energy efficient infrastructure.

After his presentation, Dr Palni, commented on the importance of having input from all the regional member countries and said that this input would be highly appreciated. In the face of growing globalisation and mounting cross-boundary environmental challenges intergovernmental cooperation at the regional level cannot be avoided; and doors should be opened to allow this to happen. The question remains of what role ICIMOD should play in this regional cooperation.

EV-K2-CNR: How Everest-K2- Council of National Research (Ev-K2-CNR) can contribute to developing mountain ecosystem conservation and climate change research initiatives in the Hindu Kush-Karakoram- Himalayan region

Dr Gianni Tartari, EV-K2-CNR, stated that Ev-K2-CNR had activities in the Hindu Kush-Karakoram-Himalayan (HKKH) region in the Pakistan Karakorum Trust area and in Nepal's Sagarmatha National Park and China's (Tibet Autonomous Region [TAR]) Qomolungma National Park (QNP). They shared high-altitude research systems, including geographical information systems (GIS). They also had integrated management plans and climate change impact assessment programmes and, as part of the Hindu Kush-Himalayan partnership, were studying issues of forest management, water pollution, and impacts of climate change on forest and glaciers.

EV-K2-CNR has made a concrete contribution: it has had a network in the Khumbu Valley since 1994. The data collected are free of charge to all genuine researchers and are available either in excel or pdf formats. The data collection stations are located at >5,000 and 8,000 metres. Contact Dr Tartari at: tartari@irsa.cn.it.

Questions and Answers

Q: Dr Ukesh Raj Bhuju (Nepal National Committee of the International Union for the Conservation of Nature [IUCN] members) asked if there were any similar stations which were collecting the same type of data as Ev-K2.

A: Yes, there are two stations in Pakistan (one is in Baltoro) and there are plans for expansion. Dr Tartari appreciated the question and said that this is a critical area of research and that there is a lack of quality data collection at high altitudes. Stations can be established initially for about 15,000 Euro, but then they need to be maintained.

Q: Dr Gregory Greenwood (Mountain Research Initiative [MRI]) asked what Ev-K2 could contribute to the transect idea.

A: Dr Tartari said that Ev-K2 had worked in this area for the past 20 years and would be happy to share their experience and data. In places where socio-political and economic conditions were difficult, they had made a special effort to involve the local population.

Food and Agriculture Organization (FAO) and the Mountain Partnership Secretariat

Dr Douglas McGuire said the FAO has had technical programmes dealing with 1) food security and nutrition; 2) livelihood support and rural development; 3) Integrated watershed management; and 4) emergency support, a recent example being the latest earthquake in Pakistan. The FAO had been active in offering technical assistance for many years; it has responded to challenges in areas such as Reducing Emissions from Deforestation and Forest Degradation (REDD), agrobiodiversity, the Global Terrestrial Observing System (GTOS), and others, as well as capacity building and policy support.

The Mountain Partnership (MP) was established as a voluntary alliance and is now comprised of over 150 organisations which collaborate on sustainable mountain development; it is effective on the ground. Mountain Partnership HKH members include four of the eight Himalayan countries, namely, Afghanistan, Bhutan, Nepal, and Pakistan, as well as many international/non-government organisations (INGOs/NGOs). The MP has a decentralised hub for Asia and the Pacific hosted by ICIMOD (Zaya Batjargal). The MP biodiversity initiative had been involved in 'twinning' the Sagarmatha National Park in Nepal with the Gran Paradiso National Park in Italy.

MP can respond to challenges by providing a framework for cooperation on mountain biodiversity within the Biodiversity Initiative: it can also provide support to develop collaborative action with key stakeholders (such as project formulation, resource mobilisation, and so forth.) and form linkages to other regions as well as providing networking, information, and knowledge management support through Mountain Forum.

In conclusion, Dr McGuire said that ICIMOD should play a key role at the regional level by providing expertise. What is most needed is technical, financial, and political support in an integrated approach that also takes human aspects and livelihoods into consideration.

GLORIA - Global Observation Research Initiative in Alpine Environments

Dr Harald Pauli, GLORIA, University of Vienna stated that GLORIA studies pristine versus anthropogenically altered environments at high elevations (subnival); some boreal and arctic mountains in North America and in New Zealand. Through GLORIA's simplicity and the large number of sites it has, it has excellent potential for synergistic interaction with the Long-term Ecological Research Network (LTER), Global Mountain Biodiversity Assessment (GMBA) activities, Mountain Invasion Research Network (MIREN), ethnobotany, and the European Environment Agency (EEA)

GLORIA master sites also have additional activities on other organism groups (e.g., arthropods, amphibians) climatology, vegetation, and species' modelling) GLORIA is an open process – it can be joined at any time. GLORIA coordinates and communicates with more than 50 groups on standardisation, advice on methodology, training, publication strategy, data ownership issues, central database and website, method testing, master sites, public relations (PR), and policy.

How can GLORIA contribute to this region? By establishing mountain biodiversity observatories that are long term: the first thing being to focus on pristine areas, but these would be difficult to find and most areas are strongly impacted by land use such as grazing. It is necessary to keep in mind that observatories would be in different cultural situations.

Implementation of GLORIA: South America: the first sites through the United Nations Educational, Scientific, and Cultural Organisation's Man and Biosphere programme (UNESCO-MAB), then Peru and Chile, now eight transboundary reserves (TRs)—a further 11 are planned (Proyecto Páramo Andino – CONDESAN [Consortium for Sustainable Development of the Andean Ecoregion], Conservation International, Herbario Nat. Bolivia, Com. Andina de Naciones). The network is narrowly focused on mountain biodiversity, but it has excellent potential for interdisciplinary cooperation with other programmes, structures, and initiatives. Vegetation often grew slowly, so this kind of work is long term. It is important to have regional nodes to establish national sites: in Latin America there is already a regional node between Ecuador and Bolivia.

Ongoing work in the HKH area is in the Saipan region (Jumla-Rara area); Kanchenralba/Kanjiroba Himal area; Annapurna Himal Area; Gosaikunda and Langtang Himal area; and Sikkim's Kanchenjunga Himal area. Collaborative work is being carried out with the Missouri Botanical Garden and Nepalese partners as a West-East arrangement across Nepal to Sikkim, (Bhutan) with the Edinburgh Botanical Garden and Nepalese partners and in the Annapurna region (humid South and arid North).

Questions and Answers

Q: Who are your partners in Sikkim?

A: Dr Puna in Oxford.

Q: Data availability and on-line sharing?

A: This is not the initial idea but will be a requirement for the long term. It has to be discussed with the contributors, because we are not allowed to share data without their consent.

Q: How are Nepalese botanical gardens involved, except for individual scientists?

A: This cooperation will soon be strengthened.

Q: Can you confirm whether temperature monitoring takes place also?

A: Yes on four points, each of the summit sites monitors temperature.

GMBA (Global Mountain Biodiversity Assessment) and cooperation in the HKH

Dr Eva Spehn: University of Basel, Switzerland, discussed the outcome of the Pre-Conference Workshop, 15-16 November, 2008, ICIMOD, Kathmandu: Linking Geodata with Biodiversity Information in the Hindu Kush-Himalayas, Creating a Regional HKH Biodiversity Information Hub and Linking It to Global Initiatives.

Dr Spehn stated that ICIMOD has expertise in biodiversity and the Mountain Environment and Natural Resources Information System (MENRIS) and GMBA form a cross-cutting network of the International Programme of Biodiversity Science (DIVERSITAS). It actively explores and synthesises mountain biodiversity research, it links science and policy as in the case of the Convention on Biological Diversity (CBD) and the Millennium Ecosystem Assessment (MEA). It links biodiversity databases with geographic data to select mountain-relevant data and combine ecologically relevant information with biodiversity patterns in order to model species' distributions (niche models) and ecosystem boundaries. Data are available from data portals by species, country, or data collector. GMBA has kept a catalogue of who has which data and how well they fit mountain biodiversity research. ICIMOD already has a thematic portal for Nepal for protected areas, and this can be searched for data on biodiversity.

Dr Spehn said that GMBA's Mountain Data Portal at the Global Biodiversity Information Facility (GBIF) features an annotated catalogue of electronic geo-referenced mountain biodiversity databases. Specific search criteria for mountains include altitude, slope, ruggedness, and mountain life zones (below or above the tree line).

ICIMOD-GMBA A way forward

It was thought that there is an urgent need to increase the amount and quality of geo-referenced data on mountain biodiversity provided online to meet the challenges of global change. Data sharing and harmonisation includes

adoption of international standards for HKH data (Darwin Code, the Integrated Taxonomic Information System (ITIS), Metadata National Biological Information Infrastructure [NBII] standards). The next step would include data sharing, harmonisation, and standardisation of taxonomic names. ICIMOD should become a regional Global Diversity Information Facility (GBIF) node. There should be a regional training workshop for regional member countries (RMCs) on data sharing and collection methods. Once the mountain portal is in place, it will be easy to access the data.

Biodiversity data standards, metadata, geo-referencing tools and methods (BioGeomancer):

-> Capacity building and training (hands-on workshop with GMBA / GBIF) are the way forward.

A list of HKH biodiversity data should be compiled by feeding the geo-referenced data available into GBIF (e.g., Flora Tibetica), GMBA Mountain Portal, and the Mountain Geo-Portal of ICIMOD: easy and open access to biodiversity information from the HKH region will be provided on a global portal.

Questions and Answers

Q: (Dr Tartari) A more detailed discussion on data sharing is needed because presenting data in international journals takes years: the Internet Security and Acceleration Server (ISA) standard is used, and it is important to regulate data properly. Several projects have an idea about data sharing and property rights.

A: This is a critical bottleneck, but it has already been solved by GBIF, without all this nothing can happen. ICIMOD should also pay attention to this and remind the RMCs. Yes, material on this is available on the web. There are recommendations for GBIF regulations and sharing space. It is a template with a fixed column and is readily available.

IUCN-WCPA Mountains Biome

Dr Graeme L. Worboys, Vice Chair (Mountains Biome), IUCN World Commission on Protected Areas (WCPA) told participants that IUCN, the International Union for the Conservation of Nature is a non-government organisation governed by a council of elected representatives. It consists of 1,000 government and NGO members in 160 countries, 11,000 volunteer scientists, and 1,000 professional secretariat staff working in 60 countries. The IUCN WCPA is one of the six commissions of IUCN and has approximately 1,300 protected area specialists. The WCPA Mountains Biome was pioneered by Emeritus Prof Dr Larry Hamilton in 1993: it currently involves about 350 active mountain protected area professionals. WCPA facilitates connectivity conservation initiatives around the world as it is involved in connectivity conservation work, especially in the mountains, a key direction of the WCPA Strategic Plan and a key target of the Council on Biodiversity's Programme of Work on Protected Areas (CDB PoWPA).

WCPA facilitates connectivity conservation initiatives in the HKH as determined by the 2008 Connectivity Conservation Workshop at the IUCN World Council on Climate Change (WCC), Barcelona, and the 2008 Connectivity Conservation Workshop in partnership with ICIMOD and WWF in Dhulikhel, Nepal, from 11-15 November 2008.

Context for managing connectivity conservation: The realisation that a shared connectivity conservation vision is critical; people, nature, and management settings are critical; connectivity management is situational; and connectivity management is complex and it is dynamic.

People from the HKH (esp. Nepal) were present and influential in earlier meetings and involved in the big picture around the world. Small, focused workshops had been held to build the concept of connectivity conservation and protected areas.

Questions and Answers

Q: There was a shared vision about such a workshop here in Kathmandu, and it was realised, why?

A: It was a strategic reaction to global change.

Q: How to manage these complex areas, including conceptual frameworks on how to manage them?

A: The workshop gave feedback on a prepared framework and about what action should take place. Three contextual pathways first needed to be understood: people, management setting, and shared vision. This conceptual model was adopted and improved and will be published later this year.

Q: So how is it actually managed?

A: Leadership (at multiple levels and different people) is essential, as is evaluation and other things. Work has been undertaken in three corridors (Altai Sayan, Brahmaputra-Salween, and Pamir-Karakoram), and there is a special interest in working at the transboundary interface. The programme wishes to maintain contact as a voluntary, low-key international network.

Q: What is the role for ICIMOD and partners?

A: The role for ICIMOD and its partners is to continue to help facilitate these connectivity initiatives, particularly at the transboundary interface. At the request of the Dhulikhel participants, an informal, voluntary, network of connectivity conservation people will be established by IUCN WCPA. ICIMOD and IUCN WCPA can work together as part of a low key, voluntary, international network of connectivity conservation initiatives.

Q: Does this cover the Terai Arc landscape?

A: Yes, with good feedback and participation.

Mountain Research Initiative (MRI)

Dr Gregory Greenwood, Executive Director, Mountain Research Initiative (MRI), University of Bern, Switzerland, said that MRI is different from Global Change in Mountain Regions (GLOCHAMORE) and GLORIA which are well focused research projects. MRI only deals with interdisciplinary and transdisciplinary research. Some of the activities of MRI include networking meetings for synthesis and adaptation of the GLOCHAMORE strategy of research in various regions. In the HKH, MRI has worked through partners. MRI's approach to research is often expedient and tangential, making the most of what is already available; for example, MRI has started working with the Monsoon Asia Integrated Regional Study (MAIRS) which already has an established research strategy. For the same reasons, MRI expressly did not do this in the HKH-Tibet since there already were many previous claimants to global change research in the region. Notwithstanding MRI has been involved in discussions with Chinese researchers in Beijing who have indicated their interest in working with MRI and the Chinese Academy of Sciences (CAS). Such an alliance will help us to take a look at the whole system of mountain regions in Asia. Several proposals have been submitted to the Asian Productivity Network (APN) for funding, because funding is most important.

Questions and Answers

Q How will MRI deal with challenges?

A: It will pursue partnerships and new opportunities are coming up at this meeting. The transect project will provide MRI with a framework within which it can bring in researchers.

Q: How can ICIMOD be involved?

A: ICIMOD can be involved in the formal vetting of the GLOCHAMORE research strategy and use it as a yardstick for the kind of research that is happening in the region. The establishment of transects in the HKH will change the game plan for MRI. The Intergovernmental Panel on Climate Change's (IPCC) blank spot should be eliminated. ICIMOD can be the convener here as we have been in other regions.

Monsoon Asia Integrated Regional Study (MAIRS) Mountain Zone Science

Priority research areas for MAIRS include hydrology and water availability; ecosystems and biodiversity; agriculture, forestry, and food security; natural disaster management; energy and transport; and air quality and human health. MAIRS has worked with the Asia Pacific Network funding (two cycles); the Chinese Academy of Science is funding an office and staff; and MRI participates in project planning and provides links to European and North American expertise.

MAIRS has worked with ICIMOD in the Cryosphere and Hazard Workshop (April 2007) during which several potential collaborative projects were identified, and there is perhaps a role for the University of Nebraska and the United States' National Science Foundation(US NSF). Water supplies are a critically important area.

Questions and Answers

Q: How can MRI respond to the challenges of the region?

A: Barring new funding, MRI will continue to pursue partnerships that facilitate progress towards research. New

opportunities from this meeting : the Mountain Biosphere Reserve(MBR)-based network (from the UNESCO meeting) and, for GLOCHAMORE implementation, transects to fill in 'blank spots' for The International Panel on Climate Change's 5th Assessment Report (IPCC AR5). The necessary requirements are networking, funding, and coordination.

Q: How can ICIMOD be involved?

A: Perhaps by adoption/adaptation of the GLOCHAMORE research strategy; coordination of efforts to create a network of interdisciplinary research sites (e.g., MBRs); and coordination of efforts to create transects of mountain observatories: all aimed at eliminating the 'blank spot' for IPCC AR5.

United Nations Environment Programme (UNEP)

Mr Subhrata Sinha stated that an understanding is needed of the 1) uncertainty of ecological data and collection, hence the need to invest more efforts; 2) impacts of climate change on the mountains and at local level; 3.) the importance of the landscape approach and that the focus will be on this; 4) the importance of regional cooperation and the need to bring countries and agencies on to a platform for regional cooperation; and 5) the need to build capacities so that communities can deal with climate change with resilience.

As far as programming is concerned, the UN is undergoing reforms and UNEP also. This year UNEP formulated a new work programme which will be implemented from 2010 onwards, and it is no longer at activity level. The governing councils have given the following directions for action: climate change, ecosystem management, governance, disaster, and resource efficiency; and the first three are directly relevant to the HKH.

Questions and Answers

Q: How will UNEP be involved in the HKH and with ICIMOD?

A: 1) UNEP has a long standing partnership with ICIMOD. For example, UNEP was involved in the glacial lake outburst flood (GLOF) study. This was well received and now needs more investment (2002-2007). 2) UNEP was involved in the Mountain Environmental Knowledge Hub, for which ICIMOD is host. 3) UNEP worked with ICIMOD and DATA Nepal (on the World Bank site www.worldbank.np) on the Biodiversity Yearbook for Nepal. This is now available on the Mountain HKH portal. 4) The Kailash landscape programme which focused on the collection of both data and information on ecological and climate change and on the assessment of the impacts of climate change, as well as regional cooperation on these topics. 5) In the Karakoram area, UNEP has been involved in data collection, climate change, impact assessments, and promoting resilience and capacity building.

United Nations Educational, Scientific and Cultural Organisation's Man and Biosphere Programme (UNESCO MAB)

Dr Thomas Schaaf: UNESCO's MAB Programme stated that the Mission of UNESCO is to build peace in the minds of men through education, science, and culture. There are 50 field offices worldwide, including in Kathmandu, Delhi, Dhaka, Beijing, and Islamabad.

Dr Schaaf stated that climate change in mountain areas is a key priority for UNESCO. In terms of land-use changes and trends UNESCO focuses mainly on biosphere reserves. Balancing conservation with livelihoods is an area in which UNESCO can demonstrate how environment and economic development can go hand in hand. UNESCO has a number of transboundary-linked biosphere reserves, as well as a transcontinental biosphere reserves between Europe and Africa. In the HKH there is huge potential, and the banner of UNESCO could help to strengthen it, especially in sensitive border areas. Nanda Devi (India), Quomolongma (TAR) and a new one in Sikkim have potential for corridors and transboundary collaboration. UNESCO is also involved in capacity building, education, and outreach. ICIMOD will remain a privileged partner institution for UNESCO for everything related to the HKH. UNESCO has produced a teaching resource kit.

Chair: Prof Messerli stated that three UN organisations (UNESCO, FAO and UNU) were very much involved, so we should keep that in mind.

Questions and Answers

Q: Are these teaching kits also available for translation into regional languages?

A: Yes, we already have good examples of this, and there is hope for a new kit too.

United Nations University (UNU): Mountain Research and Development – An Adaptive Institutional Response to Evolving Knowledge and Needs – Responses from Global Programmes

Dr Libor Jansky: United Nations University (UNU) gave a short presentation in which he highlighted UNU's involvement in the Pamir-Alai (Altai) – a region with very similar geomorphologic and climatic conditions as the HKH. UNU's interest is in targeted research and capacity development through various projects. It is also interested in sharing knowledge and expertise among local, regional, and international partners as well as in collaborating through open global mountain partnership programmes. UNU would also be interested in an umbrella programme incorporating existing and future projects; and offering basic activities in methodology, institution building, social empowerment, and dissemination of knowledge.

UNU's interest in research is in the areas of: 1) maintaining peace and security in complex political environments; 2) supporting the coexistence of people with different cultures, languages, and social systems; 3) seeing that issues of human rights and gender equity are an integral part of local development options; 4.) studying the economic and social aspects of transformation in the context of globalisation and global climate change; 5) studying the vulnerability and adaptation of coupled human-ecological systems in the mountains; 6.) seeing that science and technology are applied for the benefit of mountain regions and the people who live there; and 7.) using human values to improve the quality of life.

UNU is also interested in capacity building when it is specifically related to: 1) building a knowledge base and bringing about awareness to facilitate better decision-making; 2) improving individual health, literacy, and other skills required to adapt to differing and changing circumstances; 3) integrating laws, policies, and strategies to encourage sustainable development and promote environmental integrity; 4) improving management practices and techniques; 5) fostering institutions that encourage and support partnerships and cooperative arrangements; 6) developing appropriate infrastructure and technology to support sustainable development; and 7) identifying and promoting sustainable financing mechanisms.

Several decades of mountain programmes in collaboration with Prof Messerli and others and particularly programmes in different regions had shown that, as far as UNU is concerned, sustainability-in any and all aspects-is crucial. The mountains closest to the Himalayas are the Pamir-Alai and here UNU has had experience with local researchers and pilot sites. Key issues for mountain areas, including the Himalayas, were discussed and recommendations were summarised in a publication 'Mountains of the World: A Global Priority' (edited by Bruno Messerli and Jack D. Ives) in 1997. This publication contributed to much-needed worldwide awareness of mountain issues. There are already several types of partnerships that could be used under a type of umbrella project. Research should be linked to the local people and local expertise, in spite of the fact that it might sometimes not be what the scientific community or peer-reviewed journals want.

Questions and Answers

Q: Prof Martin Price asked do you mean that a UNU umbrella or some other existing mountain partnership umbrella should be used?

A: Definitely not a UNU umbrella: the existing Mountain Partnership umbrella can be used but efforts should be made to see that it is not overly bureaucratic. Care should also be taken to see that the process does not stay at the political level: it should be made concrete and have a good operating mechanism.

Wetlands International (WI)

Dr Chris Baker from The Netherlands told participants that WI is an NGO that focuses exclusively on wetland conservation but, in the past, it had focused also on biodiversity in general. WI tried to encourage sound science as

much as possible. Its current activities include the HKH, but in the past it had traditionally been active in India and in China. Its recent initiatives are on the Regional Wetland Initiative and the International Waterbird Census.

WI will need to strengthen linkages with available knowledge bases. WI's future plans include continuing its present work, especially with ICIMOD and especially on the Himalayan Initiative.

From this meeting it was understood that it will be necessary to improve linkages, Wetlands need to be in the overall picture in terms of linkages between practice and policy, knowledge-based development, broadening the partnership to development, and water and agriculture-related organisations. The landscape approach must include wetlands. The partnership needs to be broadened to include development agencies.

WWF Critical Ecosystem Partnership Fund, Eastern Himalayan Programme (CEPF)

The focus of this programme is on the Eastern Himalayas, not the whole of the HKH. Investments are based on biodiversity hotspots. The programme has a unique partnership for funding with many contributors, for example, l'Agence Française de Développement, Conservation International, Global Environment Facility, Government of Japan, Mac Arthur Foundation, and the World Bank.

The coordinator for the Eastern Himalayas is WWF Nepal. It gives out grants to civil society organisations for biodiversity conservation projects, because they are effective but they are usually deprived of funding. Local groups are at a disadvantage and, normally cannot get access to large amounts of funds. Grants are targeted at hotspots which have a profile, each based on scientific findings.

Bhutan, India and Nepal's Kanchenjunga complex form the main focus and some parts of the Terai Arc landscape. Species, sites, and landscapes receive attention; and especially through local-level linkages where the action happens. Examples of projects are policy advocacy, involving the media; social forestry in corridors, civil society networks, and small grants which are very effective for individuals, universities, and local organisations, Work is focused on particular species for which there are no other monitoring resources.

WWF grants target biodiversity hotspots in developing countries. They are guided by strategies developed with stakeholders and go directly to civil society; moreover, they create alliances combining skills, eliminating duplication of efforts, and achieving results through an ever-expanding network of partners.

The Critical Ecosystem Partnership Fund in the Eastern Himalayas invests in 1) Bhutan Biological Conservation Complex; 2) India in the Kanchenjunga-Singhalila Corridor North Bank Landscape; and 3) Nepal in the Kanchenjunga-Singhalila corridor of the Sacred Himalayan Landscape and Critical Areas of the Terai Arc Landscape. The Fund carries out policy-level work on promoting corridors and the role they can play: work on how species' level projects can be implemented is in the pipeline also.

In India restoring corridors and transboundary collaboration among local communities receives focus, as well as projects in Sikkim and North East India. In Nepal there are ongoing projects focusing on livelihoods, education, capacity building, and traditional knowledge, as well as forest management in the Ilam and Darjeeling corridor.

Partners are involved in networking and upscaling, innovations, documenting, policy advocacy, and learning and feedback. ICIMOD has been a partner in this.

Questions and Answers

Q: How much funding is available from these small grants?

A: The maximum is \$20,000 per project.

Chair: Very interesting but very short, now how do we include transects in all these activities.

The paper gives a list of those involved in the Critical Ecosystem Partnership Fund (CEPF) programme. How can they be included?

Plenary Session V (Part 2): Global Programmes' Responses and Reactions of Hindu Kush-Himalayan Countries

Prof Martin Price, Centre for Mountain Studies, UK

Synthesis of HKH Institutions' Reactions

Dr Robert Zomer, Environmental Change Specialist, ICIMOD

Chair: Prof Xu Jianchu

Rapporteur: Ms Elisabeth Kerkhoff

The Chair of this session, Prof Xu Jianchu, set the tone by saying that the objective of the session was to ensure that the voices of the Regional Member Countries were also heard.

Prof Martin Price presented the synthesis of global programmes. The key themes expressed by the global programmes could be summarised by asking who was doing what where. Research on the climate was carried out by Global Observation Research Initiative in Alpine Environments (GLORIA): they had data loggers and Everest-K2-Council of National Research (Ev-K2-CNR) had also been collecting data for a long time. Biodiversity was being studied by Ev-K2, GLORIA, and Global Biodiversity Assessment /Global Biodiversity Information Facility GMBA/GBIF. Ecosystem management was being studied by Ev-K2. The United Nations University (UNU) had done a lot of work on capacity building, but it was not clear how this applied to the HKH region. Data compiling and sharing were essential but there were issues about whether access would be 'open' access or whether there would be limitations to access etc. One key UN organisation that was not present was the World Meteorological Organisation (WMO), and it dealt with climate issues. Who does capacity building? Many organisations could provide links to other regions and global programmes. GMBA deserved a special mention in this context. It was important to note that organisations that were working together were working with ICIMOD already.

How did the global programmes respond to the transect idea? In general, the global programmes were supportive and concurred that many of the projects they were already working on clearly fit into the transect framework. A few specific comments: Mountain Research Initiative (MRI) responded very positively and noted the importance of addressing the serious lack of data known as the 'white spot' on the earth's ecological map. They also noted that it would be necessary to formally vet Global Change in Mountain Regions (GLOCHAMORE) and asked whether the transect idea was intended to be a platform for global action. Active collaboration was already taking place but the Mt. Kailash transect could be the first concrete realisation of the transect idea.

Many global programmes had had ongoing interactions with ICIMOD through its Mountain Environment and Natural Resources Information System (MENRIS) and this could be a knowledge-sharing hub for The United Nations Environment Programme (UNEP). The United Nations Educational, Scientific, and Cultural Organisation (UNESCO) commented that it had many linkages but that it was important for all to be on target. The biodiversity transects fell right into the mainstream, thereby filling many of the other categories. Wetlands International was a good source of information for profiling wetlands, and this was an ongoing Himalayan initiative. The issue of carbon was also mentioned. The idea of flyways was cited as an interesting proposition. WWF already had a strong regional presence and link with civil society: there could be an opportunity for focusing on species that received relatively less attention.

Discussion

Comments from Global Programmes

The present listing of actors was limited. Only the larger global programmes had been invited to this conference for initial discussion of the transect concept. Should the transect concept prove viable, it would be necessary to include the numerous smaller organisations which also worked in these areas. For example, the Mountain Institute and several others needed to be included. Prof Christian Körner and Prof Martin Price both commented that this list was perhaps limited and that for the sake of the proceedings a longer list would have to be compiled. Possibly this could be circulated for comment.

The Chair, Prof Xu Jianchu, commented that capacity building was a long-term process which could involve global programmes, ICIMOD, national partners, and others. Information was much more than just databases, and on-site in-country training was essential.

Reactions of the Hindu Kush-Himalayan Countries'

Once the global programmes had presented their syntheses, ICIMOD's regional member countries (RMCs) were requested to comment on what they thought the global programmes could contribute to their countries.

Afghanistan

Er Latif Ahmad Ahmadi stated that, in 2001, the government of President Hamid Karzai had created the National Environmental Protection Agency of Afghanistan (NEPA). NEPA was working to protect the country's natural resources and rehabilitate the land; however, NEPA was a new organisation and Afghanistan/NEPA needed help with environmental policy in general since the country was in the early stages of national reconstruction. ICIMOD presently had a field office in Kabul and this could help. Afghanistan would need to have separate meetings to discuss a strategy and development plans.

Prof Xu Jianchu commented that ICIMOD's field office could help facilitate networking between NEPA and international agencies in areas such as forestry, rangelands, and others.

Later, Er Latif Ahmad Ahmadi went on to say that much of the conservation work that had been carried out in Afghanistan in the past had been disrupted by war for 25 years. The Ministry of Agriculture used to do much of this work previously, but now most of the knowhow had been lost. The Environmental Protection Agency had established legislation and added protected areas. Several agencies were already supporting this, but the need was much greater than the current support. Afghanistan supported collaboration on the Wakhan corridor but would need assistance to make it happen.

Bangladesh

Dr M Khairul Alam (Bangladesh Forest Research Institute [BFRI]) noted that of all the global programmes present at this meeting, some (such as UNEP and UNESCO) were already active in Bangladesh but many were not. There were some activities in wetland areas but not in the Chittagong Hill Tracts. Bangladesh had received small grants from WWF. The Food and Agriculture Organisation (FAO), and the International Centre for Integrated Mountain Development (ICIMOD) could take initiative through the United Nations Development Programme (UNDP). The ICIMOD initiative on livelihoods could work and, if possible, WWF could give grants for lesser-known species.

Prof Xu Jianchu commented that while much of Bangladesh was not mountainous, upstream-downstream linkages were important and that one could look at the effects that the economic corridor posed to biodiversity.

Prof Bruno Messerli commented that Bangladesh and, especially, the Chittagong Hill Tracts played an important role in the monsoon system of South Asia. It is important to study this system since any changes can have a severe impact in this part of the world; they should not be neglected.

Bhutan

Mr Karma Jigme (Ministry of Agriculture) said that at present Bhutan received substantial support from international organisations: Bhutan was actively participating with them and obtaining positive results. There was still scope for more research and capacity building support because Bhutan had a lot of biodiversity. He asked if there was any sort of platform through which young minds could actively participate to share innovative ideas for environmental conservation. The next generation needed to be groomed so that they could eventually take over.

Dr Thomas Schaaf commented that there was support for the younger generation from UNESCO's Man and Biosphere (MAB) programme through its young scientist research grants. These were available for researchers of up to 35 years of age to study environmental conservation and sustainable community-based approaches. Application forms were available on the website.

Prof Xu Jianchu commented that in this context the work to be done by the Himalayan University Consortium would be very important for training young leaders in this area.

Dr Douglas McGuire commented that the International Programme on Research and Training on Sustainable Management of Mountain Areas' (IPROMO) initiative of the Mountain Partnership offered a 2-week course for young professionals interested in mountains.

PR China

Prof Ruijun Long (International Centre for Tibetan Plateau Ecosystem Management) stated that in China there was much discussion about the Tibetan Plateau which comprises 1/4th of the country's territory and is the source of important rivers such as the Yellow River. In particular, the Current Research Information System (CRIS) and local universities had done a lot of research in this area in recent years. The government was promoting good policies by which herders shared their lands with neighbours to increase the amount of land available for grazing. The government had initiated a number of projects for grass supplements and backyard feeding in these areas: thus the government was engaged and work at the policy level was good. At the technical level, there had been a great deal of research on cross-border grazing, wetlands, rangelands, and forestry. It was likely that within the next five years the government would pay herders for environmental services to reduce herd sizes and improve ecological benefits. The area of land might be vast, but economic activities only accounted for 4% of the total GDP. ICIMOD could be involved at the research level by working out a way ahead for local herders and their livelihoods.

Prof Xu Jianchu commented that China was the biggest country in the HKH and international organisations were very welcome to work there. The Xinjiang group already had a large terrestrial carbon project in the Tibet Autonomous Region (TAR). The National Science Foundation of China was also discussing how to work through ICIMOD on regional cooperation.

India

Dr L. M. S. Palni (G B Pant Institute of Himalayan Environment and Development [GBPIHED]) stated that the GBPIED was an influential institution: it networked by sharing data with centres throughout India. Lead institutions which compiled scientific data on various themes to make them available to managers and communities had been designated. Producing data that could be understood and used by local communities remained a continuing challenge. Nowadays all information was made available through the website.

Dr S Vanuatu Reddy (Ministry of Environments and Forests, India) commented that the previous day's presentations showed that there was an interest in economic development of local communities and that this was important. Global programmes such as the International Union for the Conservation of Nature (IUCN), WWF, Wetlands International, and UNEP were interested in this and India had a lot of experience with self-help groups for this purpose. The Indian Research Councils and Institutes were very important players as well. They could help implement the projects of global organisations for socioeconomic development of India's mountain communities. India already had 15 biosphere reserves and other protected areas. In India communities were strongly involved in biodiversity monitoring. We should look for the gaps in research and think how organisations could help to fill them.

Prof Xu Jianchu commented that India had very strong national programmes and was already working with ICIMOD on many aspects.

Myanmar

Ms Naw May Lay Thant (Ministry of Forestry) stated that Myanmar did not have any programmes of its own in the area of mountain biodiversity. A biodiversity database on flora was previously published on CD. Perhaps the Global Mountain Biodiversity Assessment (GMBA) programme could standardise this and make use of it within their or other databases. IUCN activities in Myanmar had already been discussed with India and Myanmar, and these would continue. UNEP and UNESCO already provided support, maybe biodiversity activities could be mainstreamed into these if there was more support. Myanmar needed training in the HKH context.

As for conservation activities in wetland areas, Myanmar would like a RAMSAR (International Convention on Wetlands) site. At present Myanmar had no collaboration with WWF, but it would be interested in collaborating. Myanmar had 30,000 sq. km. protected under the protected area (PA) system, namely the Hkakaboraji National Park and other wetland areas. It was supported by various organisations: Wildlife Conservation Society (WCS), Harvard University's plant project, and a Japanese university. There were also both lowland and highland wetlands sites. Myanmar was also in a good position to collaborate in conservation with China and India in transboundary biodiversity in the Eastern Himalayas. The government also needed to be involved because there might be issues of illegal logging and trade.

Participants commented that Myanmar had tremendous potential for transboundary conservation, as well as being part of the Mekong region. The Chittagong Hill Tracts' border area also had potential. Unfortunately, much of the expertise on Myanmar was in institutes based in the US. National-level capacity building was very important for Myanmar.

Prof Bruno Messerli commented that Myanmar was very important for biodiversity conservation because of its rivers, but now it was also important to look at the mountain areas as they were the sources of the rivers. At present Myanmar had three stations in the plains but none in mountain areas – at least one should be established in mountain areas. Myanmar was the only country that did not have a station in the Global Climate Observing System (GCOS) programme for long-term data logging.

Nepal

Prof Ram Prasad Chaudhary (Tribhuvan University) observed that global programmes had been working with many government departments, the National Planning Commission, and non-government organisations (NGOs) in Nepal. Nepal had five strategic focus areas: protected areas, forests, mountain areas, agricultural biodiversity and wetlands. It was important for Nepal to have policy interventions during this transitional phase in its history – this was especially important in the context of understanding biodiversity conservation. Research and collaboration were needed. Nepal had had many endeavours in terms of long-term stations: in addition interdisciplinary stations were required.

- The Himalayan University Consortium would be very important for bringing together many universities under one forum and developing a curriculum specifically for biodiversity conservation.
- Local communities felt marginalised currently but it was community forests that had contributed significantly to biodiversity conservation: they needed to be assisted. Very specific monitoring tools would be needed to help farmers.
- The work that ICIMOD was doing with highland-lowland linkages was important – water-down and food-up links were essential.
- Tourism was also having tremendous impacts on Nepalese mountain slopes, and tourism was a very important economic activity. ICIMOD could take the initiative to educate the upper tiers of policy makers.
- The challenges of an emerging democracy were many. For example, some of the technocrats who were trained in infrastructural development tried to overrule national financial and environmental regulations. How could this be controlled?
- Nepal had many NGOs: they were very active and were a strong force in the country and could be important partners. This conference did not discuss how to make best use of them for addressing issues of biodiversity conservation and in working with global programmes. One of the challenges for international organisations would be how to develop local indicators and how to involve local NGOs.
- Support from global programmes was important for the growth of environmentally responsible tourism.
- One of the roles of the Mountain Forum was to help link Nepali NGOs with global programmes.
- The Department of National Parks and Wildlife had been successful in conservation at the landscape level through participatory conservation approaches—this had been achieved with help from many international organisations. Climate change could now be incorporated and opportunities for local communities could be included.
- On mountain biodiversity conservation there was still a lot of work to do. For example, research databases needed to be made more accessible to those who need to use them – they were still very academic. Additional wetland sites were needed, even though Nepal already had four RAMSAR sites.

Mr Ukesh Raj Bhuju (Nepal National Committee of IUCN Members) commented that tourism was really impacting mountain slopes all over Nepal, and was a threat to the mountain environment. Policy makers needed to be educated.

Mr Tara Lama of Local Initiatives for Biodiversity Research and Development (LIBIRD) supported the statement that NGOs play a very important role but that nevertheless they were not well represented at this conference. The role of NGOs was very important for penetrating into those sectors where government and global programmes could not.

Prof Christian Körner commented that the footprint tourism had on the landscape was usually quite small and that tourism could be very beneficial.

Pakistan

Dr Ashiq Ahmad Khan (WWF-Pakistan) stated that there were many active programmes in Pakistan; and, whereas some were very small and had no impact on the overall magnitude of the programme, others had been very successful and could be used as a model for programmes elsewhere.

Pakistan needed international support in connectivity corridors, especially in the vicinity of the Karakoram where it connected with the Himalayas. For example, the Karakoram, Tibetan Plateau, and Pamir could be connected, through various protected areas (PAs). Since it was one strip, it could easily be connected to Wakhan and Central Asia as well. This would be a big project and would have a tremendous impact on the local environment; but, in order to succeed, it would need international support. UNESCO had helped the People and Plants' project in Pakistan, and this had been very successful. If the International Centre for Integrated Mountain Development (ICIMOD) could also support this, the collaboration would be beneficial. Pakistan had a wetland programme but, although some areas were well represented, others remained neglected. ICIMOD and the Wetlands' Initiative (WI) could join hands with Pakistan on this programme. The MAB programme could be important in Pakistan, here again it would be beneficial if ICIMOD could facilitate.

Participants in Pakistan the focus was on connectivity, and connecting four countries was very interesting. The People and Plants' programme had been a great success and its publications could be used in curricula as well.

Discussion

- An electronic database for flora in Afghanistan was in the pipeline. This was very complex so help from partners and links with donors would be much appreciated.
- Universities should also be considered for collaboration because they had the capacity. The possibility for distance learning opportunities should not be forgotten.
- Dr Ambika Gautam (ICIMOD): Afghanistan was in a rebuilding phase after many years of social upheaval. Two main government institutions were directly engaged in biodiversity conservation: (i.) the National Environmental Protection Agency (NEPA), an autonomous body mandated to develop policies and strategies. It worked on planning for national protected areas. The NEPA was very interested in establishing the Wakhan transboundary system. It was working on wildlife conservation in a working group in which ICIMOD was also a member. The other institution was (ii) the Ministry of Agriculture, Irrigation, and Livestock. The UNEP policy development programme and others were engaged there also.
- Dr L. M. S. Palni (G B Pant Institute of Himalayan Environment and Development) suggested looking at the types of programmes that were funded: some were very focused, while others were broad. Those programmes should decide on common priorities to which everyone could contribute. Otherwise, the money which was available would become insufficient for doing anything in an in-depth manner.
- Knowledge transfer and joint funding mechanisms were also very important. The global programmes were not donors, but donors should help in such mechanisms.
- Ukesh Raj Bhujju (Nepal National Committee of IUCN Members) commented that prohibiting the illegal trade of wildlife, medicinal herbs, and so on should be considered as part of conservation strategies. Several members commented that, in principle, mechanisms already existed to address this.

Prof Xu Jianchu summed up the session by saying that national ownership was very important for global programmes and that coordination among them was needed in order to avoid the exercise becoming excessively demanding for both ICIMOD and national governments. Both human resources and financial resources were needed because what was being proposed would be a lot of work.

Plenary Session VI (Part 1): Strategy on Development of Coordination and Cooperation for the Hindu Kush-Himalayan Region

Chair: Dr Madhav Karki

Rapporteur: Dr A Beatrice Murray

The two sessions that closed the meeting were designed so that participants could reach agreement on an overall strategy, common elements, and a way forward for activities. In the first of these sessions, Dr Karki briefly reflected on all that had gone before, looking at elements contributing to a 'Strategy and way forward', 'What to monitor and why', 'Networking and partnership', and 'Harmony of policy and legal framework'.

He noted that the overall approach was designed to answer the challenges of reducing scientific uncertainty, facilitating regional ownership and participation in global change research, coordinating research, and achieving a synergy of results by focusing on selected representative areas on different scales. The Global Earth Observation Systems' (GEOSS) network would provide a good base, and identification and research into keystone species by using a network of field sites would be important. Various relevant international programmes had been introduced to monitor and improve understanding of land-use change, mountain biodiversity, and ecosystem services. These included the Global Change in Mountain Regions' (GLOCHAMORE) research strategy and the Global Observation Research Initiative in Alpine Environments (GLORIA) and Global Mountain Biodiversity Assessment (GMBA) networks. All indicate the need for partnership and establishment of linkages with their strategies and work. National partners had highlighted their priorities and action plans, stressing the need for integrating trade agenda, poverty reduction strategies, and other relevant factors into biodiversity conservation. ICIMOD had emphasised the need for development of tools for valuation of biodiversity services for providing more benefits to people. The key elements of the 'Strategy and Possible Way Forward' were presented as following: a framework based on transboundary transects; an approach based on landscape conservation with emphasis on connectivity and management of existing conservation or protected areas; and the objective being to carry out multi-partnership and multi-locational research for long-term monitoring of species and ecosystems in order to obtain early warning indicators. Consideration of livelihood aspects and knowledge management were also important. 'What to monitor' in these transects was answered mainly by variables that would help in understanding and developing responses to long-term change, especially change related to climate and ecosystems. Networking and partnership were a prerequisite for effective work and a core base of the partners and key programmes present at the Conference. It would be important to promote a harmonised approach to implementation of international conventions among the countries of the region through regular regional consultations and sharing of good practices, especially in policy development and implementation. Promotion of the use of traditional knowledge and local species for sustainable livelihoods was an important factor in linking conservation with livelihoods.

Following this overview, the floor was opened to an interesting and lively discussion, the main points of which are summarised below.

The approach of multiple transects/transboundary transects, and harmonizing the policy and legal framework

Most of the discussion focused on the overall approach.

Participants generally agreed that the main focus here of 'global change' was actually climate change and its effects on species, habitats, and landscapes, while recognising that elements of globalisation would be captured in any socioeconomic factors included in the protocol.

There was general agreement that it was important to have a longer-term approach which could identify meaningful change. Examples were provided of previous transboundary studies that were very good but for which there is no continuing longitudinal research which helped us to assess changes.

The participants strongly supported the transect approach for focusing research efforts on representative areas. In particular, GMBA programme thought that it could facilitate global assessments, and the United Nations Educational, Scientific and Cultural Organisation's Man and Biosphere (UNESCO MAB) programme saw strong advantages in having transboundary transects to study climate change effects and would like to set up transect research sites in

the existing Biosphere Reserves. They also encouraged the regional countries to apply for Biosphere Reserve status so that there would be more sites to facilitate this cooperation. There was a comment that it would be interesting to see how water management could be built in as water is usually dealt with nationally and not in a transboundary manner. It would be easier to include wetlands in a landscape approach.

There was considerable discussion about the need to consider the impact of biodiversity conservation and climate change on people – their lives and livelihoods. Overall, participants considered that conservation of biodiversity is only possible if it is in the interest of communities. It was important to focus on livelihoods for two reasons: first, they are a major factor in climate change impact; and second, unless people benefit they will not support (and may actually work against) conservation efforts. Examples were given of how people could benefit from exploitation of medicinal and other plants, as well as ecotourism, trophy hunting, and others. Biodiversity conservation must focus on people to be successful. In general, though, it was felt that, in this programme, research on ecosystems should come first, including research into how changes affect livelihoods and new livelihood potentials; the programme should not focus on poverty reduction activities as such but on people as part of the ecosystem. We also need to think about what biodiversity and climate change mean for different groups of people and what people themselves think is good. There was a query as to how we are connecting water in general and wetlands in particular with livelihoods.

There was another focus of discussion on the problems arising from World Trade Organisation (WTO) and intellectual property (IP) protection and the impacts on local communities. Issuing of patents for single genes sometimes led to transfer of ownership to transnational companies, and the interests of farmers are not protected. Previously farmers' interests and rights were considered. Similarly the WTO is trying to introduce withdrawal of subsidies to poor farmers, if this happens conservation cannot be realised as the farmers will be forced to overexploit the resources in order to survive. The point was made that developing countries only give assistance to local subsistence farming communities and this should not be viewed as a subsidy. There are problems with intellectual property rights (IPR) in mountain areas. Protection of plants is a challenge as they are self replicating. Plant breeding and innovation are also ways of generating plants and should be taken into account in biodiversity discussions. Other participants noted that the access and benefit-sharing (ABS) provisions under the Council on Biological Diversity (CBD) did offer opportunities for communities to benefit from biodiversity, thus encouraging community-based conservation. Signatory countries should put the necessary policy and legal framework in place. The issue was to identify, capture, and generate revenue from local knowledge.

A further point was that not only biodiversity but also indigenous communities and cultures should be a focus of conservation efforts. In some places like the Chittagong Hill Tracts (CHT) there is plenty of funding available, but it is not helping the indigenous population who are shifting cultivators and guardians (and to some extent developers) of the existing biodiversity. The impact and sustainability of large artificial wetlands like the Kapta and Loktak Lakes also need to be studied. It was pointed out that ICIMOD has some activities addressing issues related to shifting cultivation in the CHT areas.

What to monitor and why – the research focus

The focus is all important and some felt that although the concept was interesting it was still too wide. We need to be clear what we want to achieve. Among others, it was important to align with the research priorities of the regional countries. Really we are interested in changes because they are important to people who get medicines, foods, and other essential services from the environment. The plea is to look at enough separate pieces that we can make sense of the picture. We need to think holistically, but activities must be packaged into fundable pieces.

What to monitor and why and how – the research protocol

What are the critical elements involved in biodiversity research related to global change?

Good protocols exist above the tree line (alpine biodiversity) but we have heard little about forest biodiversity and agrobiodiversity. The GLOCHAMORE strategy could be the basis for a joint protocol. For alpine regions, GLORIA would encourage extending the network in the HKH region, particularly to those countries without a site. There are several suitable possibilities, particularly in the west of Nepal and also in Bhutan. (A field trip would leave on the

21st to look at one site in Nepal.) We should also remember that wetlands are often good indicators of climate change.

How? – Networking and Partnership

It is important to have joint initiatives to make use of the limited resources.

We need committed people, funds, and government blessing. It might be necessary to have a separate committee for each transect.

Overall a strong 'anchor' was needed with a light and suitable facilitation mechanism, and ICIMOD could provide a useful basis and platform.

One possibility that should be investigated is to build stronger partnerships with universities and make use of the many graduates and postgraduates in the region.

Mountain Forum could provide a good basis for networking.

The session was concluded by the chair who commented that the overall strategy and way forward as presented and discussed had met the approval of the participants and that the major steps would be elaborated upon in the proceedings of the Conference.

The session was followed by a complementary session chaired by Dr Greg Greenwood in which partners were identified for specific tasks, especially networking, carrying out follow-up activities, and sharing information.

Plenary Session VI (Part 2): A Way Forward

Chair: Dr Gregory Greenwood

Rapporteur: Mr Karma Phuntsho

Dr Greenwood noted that it was usually the enthusiasm of individuals that made many things happen and in order to gauge this enthusiasm he engaged the audience in a show of hands 'poll' to see what they thought the next steps could be. He asked the following questions, the audience's responses are given in brackets.

First was a series of question on group demographics.

- How many in the audience are involved in research? (about 50%).
- How many work for government agencies or are government employees? (a few, ~3 people)
- How many control a budget of any kind? (a few, ~3 people)
- How many are involved in making policy at any level? (a few, ~4 people)
- How many work for NGOs? (many - about twelve people)
- How many would remain in active contact with other participants? (about 25%).

After this show of hands, Dr Greenwood concluded that most of the participants were involved in research. He continued by stating that the International Centre for Integrated Mountain Development (ICIMOD) would need to manage transects as an 'active' task so, defining 'active' as five per cent of working time over the coming six months how many would like to stay in active contact with ICIMOD and others on biodiversity as discussed at this conference? How many would be willing to give five per cent of their time to remain in touch with each other for the promotion of biodiversity conservation in the mountains? (A large number of participants expressed their willingness.)

- How many would be willing to contribute data? or fight for funding? (25-30%) Please contact Dr Eklabya Sharma
- How many would be willing to work with the Global Observation Research Initiative in Alpine Environments (GLORIA)? (about 10 people). Please contact Dr Harold Pauli.
- How many would be interested in the study of plants in mountain areas:
 - invasive plants? Please contact Dr Greg Greenwood.
 - aquatic plant biodiversity? (2-3 people)
 - the role that biodiversity plays in maintaining slopes? (more than 50%)
- GLORIA focuses on research in alpine plants, but how many other programmes would be interested in biodiversity programmes that contribute to ecosystem services?

- How many would be interested in education programmes related to biodiversity? (about 5 people)
- How many will go to Thomas Schaaf's workshop (United Nations Educational, Science, and Cultural Organisation's Man and Biosphere (UNESCO-MAB) programme tomorrow? (30%)
- How many are interested in past environmental change, paleoclimatology, paleoecology, or dendrochronology (tree rings)?
- How many are interested in how climate change affects protected areas and corridors?

After conducting this informal poll, Dr Greg Greenwood went on to conclude that the audience consisted mainly of researchers and that this was good, because most likely transect sites would start by being interdisciplinary research sites.

- Could ICIMOD consider promoting application of the Global Change in Mountain Regions' (GLOCHAMORE) strategy in the HKH?
- Could transects be put into operation by setting up observatories?
- How many are interested in addressing land-use and livelihood issues?
- Publications on and about the HKH have been around for 50-60 years. How many would be interested in looking at publications about the qualitative aspects of climate change?
- How many would be interested in participating in developing a book about climate change in the HKH?
- How many are interested in the Monsoon-Asia project?
- How many are interested in policy research on topics such as payment for environmental services? (10-15%)
- Tourism income benefits only about 20% of the mountain population. How many are interested in sustainable tourism? How to change tourism so that it can benefit more people. How many are interested in policy research to find out how income distribution can be improved

The enthusiasm that people have is what makes things happen; a lot of enthusiasm has been shown here today.

Discussion

Comments from the audience centred on the following topics.

- Payment for environmental services is important for future work.
- In addition to enthusiasm, institutions with the mandate to maintain continuity of development programmes are needed.
- Creating geo-referenced biodiversity data should be given due importance.
- It is important to involve the younger generation of professionals in biodiversity conservation. It is important to involve both individuals and institutions in biodiversity conservation initiatives.

Dr Karki (ICIMOD) added that it is important to study both past trends and to look forward. In particular, it is essential to look at valuation of payment for environmental services.

The Director General of ICIMOD, Dr Andreas Schild, commented that, in the scientific community, it was not uncommon to encounter great enthusiasm during the first two to three years but after that enthusiasm wanes and projects are abandoned: there is no continuity and consistency often because the initiative is too individualised. It is necessary to secure continuity as well as enthusiasm. Prof Christian Körner supported the idea that continuity is essential and went on to say that if there is continuity in data collection then it is also possible to overlay and link data from different fields, giving great additional value to the data collected individually.

Mr Ukesh Raj Bhujju (Nepal National Committee of the International Union for the Conservation of Nature [IUCN] Members) added that it is so important to communicate enthusiasm to youths so that they can carry on the work. Uzbekistan's Dr Ashiq Ahmad Khan (WWF-Pakistan) supported this notion and gave the example of the 'trophy hunting' that he had initiated many years ago as a small effort. As the idea caught on it was taken up by government and other agencies and now contributes significantly to conservation and livelihoods. It is important to propagate one's ideas.

Concluding Remarks

Remarks by HKH Regional Representatives, Global Programmes, and ICIMOD

Chair: Dr Eklabya Sharma

Rapporteur: Dr Isabella Bassignana Khadka

Dr LMS Palni, G. B. Pant Institute of Himalayan Environment and Development (GBPIHED) spoke on behalf of all the HKH regional member countries.

Prof Palni commented on the growing regional awareness of the need for conservation and gave the example of the Indian government which had recently allocated 1,000 crores* for the preservation of forests in mountain areas – the target being 66% forest cover. While this amount in itself was probably only a token, it was indicative of a general attitude on the part of the government and of a realisation on its part of the need to link biodiversity with livelihoods. Prof Palni encapsulated the need to link biodiversity conservation with the needs of real people by saying that ‘conservation without compensation is only conversation’.

This conference had shown that there is a general agreement of the real need for a long-term programme for data collection and that this needs to start now. He also commented that, in the recent past, funding for research had been decimated to such a degree that many researchers had lost interest and had not groomed a new generation for the task. How to rekindle an interest in science among a new generation? Is field-based science an endangered species? Other constraints were those of funding, available manpower, and inter-governmental issues.

Prof Christian Körner, University of Basel, Switzerland, summarised discussions on behalf of the global programmes. He commented that often global programmes, including those represented here, did not have big funding sources at their disposal and that more often than not their offices were manned by only one person. He gave the example of Graeme Worboys’ IUCN (The World Conservation Union) and the World Commission on Protected Areas (Eva Spehn) where in both cases the programmes were more or less manned by a single person. While these global programmes had the know-how, the actual funding had to come from elsewhere.

Prof Körner was of the opinion that all the data that had been collected to date had been paid for by the taxpayers and for this reason alone should be in the public domain.

He praised the International Centre for Integrated Mountain Development (ICIMOD) for having produced a significant number of publications (more than 500 books over the past 25 years) and for having convened many conferences and workshops. But, he went on to add, ICIMOD was much more than ‘noise and paper’ and that he had witnessed for himself the real impact that ICIMOD has had through its Godavari Demonstration and Training Centre. Many farmers in the immediate vicinity of the Centre had benefited from the improved methods disseminated by ICIMOD, and the difference they had made was impressive.

Dr Andreas Schild, ICIMOD, stated that changes were taking place worldwide, especially in mountain regions. These changes were due to globalisation, climate change, and other factors. There was recognition that mountains play a pivotal role and it would be ICIMOD’s role to explain this at the local, national, and regional levels.

Dr Schild outlined the following important points. In taking on the challenges that change would bring it would be necessary to enthuse the youth of the region because they were the ones who would eventually be taking this on. There was a growing awareness of the changes that were taking place in the region and that very specific approaches needed to be taken in the mountains. Two countries in particular had been proactive in this area: China had already instituted payment for environmental services in mountain areas and India had just announced its national strategy for dealing with climate change and, within this plan, had specifically acknowledged the important role that Himalayan ecosystems played and the need to help conserve and preserve them.

What have we learned from this conference? Prof Messerli emphasised the need for a regional transboundary approach and Prof Körner told us that we would need young people who were ready and willing to get their hands dirty. One thing was certain and that was that we would need a new generation of professionals who were enthusiastic and ready to take up research in the mountains.

* One crore is one hundred lakhs (100 x 100,000 rupees), equivalent to approximately US\$200,000 at an exchange rate of US\$ 1 = IRs 48

The alpine region of the Himalayan region, which covers three per cent of the globe, contains four per cent of its biodiversity. There were many exciting possibilities for establishing corridors. One possibility was the Pakistan Karakorum corridor another was the Afghanistan-Uttranchal-Nepal corridor: other exciting developments included developments in China where the government was involved in paying for environmental services to help herders reduce the size of their herds. Dr Schild acknowledged the concrete list proposed by Dr Chaudhary of Nepal. For this we needed to acknowledge the role that universities could play in cooperating with the Himalayan University Consortium – this would be of strategic importance in future. In this the farmer also would have a real role to play in capturing and preserving biodiversity in the mountains. Biodiversity was an essential element for sustainability in mountain areas – to produce viable products and prevent outmigration. Here it would be necessary to identify success stories to use as leverage in discourse with policy makers.

Global programmes work because of individuals. How to focus on the essential? It was important to see that whatever course was chosen it would be realistic and feasible. It would be ICIMOD's task to convene a committee whose job would be to prepare a concept note outlining the essential elements – this would be used as a basic menu to be shared with the regional member countries (RMCs) and discussed and refined with them. Strong national institutions were needed as partners – ICIMOD would hold discussions with them to agree upon a minimum protocol.

The United Nations Environment Programme (UNEP) had indicated that it would be willing to provide funding for studies in one specific corridor. One model that we could think of was having a minimum protocol common to all transect studies: in cases where funding was greater, additional elements could be incorporated. In any event, it needed to be clear that these studies were not for the short term. Could we not provide some concrete elements for the International Panel on Climate Change's (IPCC) Report #5 in cooperation with the RMCs?

It would be necessary to link biodiversity with livelihoods because it would not be possible to convince relevant funding agencies to invest in science alone – whatever course was to be taken it must be tangibly in the best interests of the RMCs. One tangible argument is that products from the mountains could help to prevent outmigration. So far, the buy-in from global sponsors was showing that ICIMOD was on the right track in its approach to climate change and biodiversity conservation. He thanked the ICIMOD staff.

Prof Bruno Messerli

Prof Messerli reflected on how very far we had come since the 1992 Rio Summit Agenda 21 Chapter 13 on Sustainable Mountain Development. This was a remarkable development, but it had taken 16 years to materialise. Now that mountains had been included could we look forward to having 'livelihoods' included in the next Summit? Much work had taken place at institutions such as the Global Climate Observing System (GCOS), Global Change in Mountain Regions (GLOCHMORE), and the Convention on Biological Diversity (CBD) but perhaps they had over defined it – it would now be our task to sift through this work and choose or focus on those aspects most relevant for transects in the HKH. Focusing would make it easier for intergovernmental cooperation and for funding agencies.

ICIMOD could be instrumental here. For each particular transect or site it would be necessary to decide upon the minimum information that could be contributed. More data could be contributed from sites with greater capacity. Transect sites should be selected keeping in mind that concrete data would need to be collected for a very long time. This could be done in conjunction or collaboration with the United Nations Education, Science, and Culture Organisation's Man and Biosphere programme (UNESCO MAB), Global Change in Mountain Regions (GLOCHAMORE), Global Observation Research Initiative in Alpine Environments (GLORIA), and Global Mountain Biodiversity Assessment (GMBA) or an integration of these. These could all then bring data up to the global level for information sharing. What would the role of ICIMOD be? ICIMOD could work with the RMCs to help sort out what would be feasible and what monitoring could realistically be expected based on potentials and limitations.

What would the time scale be? We would need to think on a very long-time scale, maybe one generation, maybe 30 years.

Annex 1 Letter From Dr Ahmad Djoghla, Executive Secretary, CBD



Secretariat of the Convention on Biological Diversity



Message from the Executive Secretary

Dr. Ahmed Djoghla

**To the International Mountain Biodiversity Conference
On
“Biodiversity Conservation and Management for Enhanced Ecosystem Services: Responding to the
Challenges of Global Change”**

**International Centre for Integrated Mountain Development (ICIMOD)
Kathmandu, Nepal, 16-18 November 2008**

Mr. Andreas Schild, Director General, ICIMOD and distinguished participants,

It is an honour and a privilege to be able to address this important meeting.

I would like to convey my warm-hearted congratulations to ICIMOD for organizing this important international conference, and my sincere apologies for not being able to join this conference due to other commitments.

The aim of this international conference “biodiversity conservation and management for enhanced ecosystem services and responding to challenges of global change” resonates strongly with the Convention on Biological Diversity (CBD) as we continue to promote the role of biodiversity in the delivery of ecosystem services in order to sustain and improve human well-being.

Mountain systems, covering about 27 per cent of the world’s land surface and directly supporting 22 per cent of the world’s people, are the water towers of the world, providing for the freshwater needs of more than half of humanity. The world’s mountains encompass some of the most spectacular landscapes, a wide variety of ecosystems, a great diversity of species, and distinctive human communities. The world’s principal biome types—from hyper-arid hot desert and tropical forest to arid polar icecaps—all occur in mountains. Mountains support about one quarter of the world’s terrestrial biological diversity, with nearly half of the world’s biodiversity “hotspots” concentrated in mountains. Almost every area that is jointly important for plants, amphibians, and endemic birds is located within mountains. Of the 20 plant species that supply 80 per cent of the world’s food, six species (maize, potatoes, barley, sorghum, tomatoes, and apples) originated in mountains. A large portion of domestic mammals—sheep, goats, yak, llama, and alpaca—originated in mountain regions. Genetic diversity tends to be higher in mountains associated with cultural diversity and extreme variation in local environmental conditions.

However, mountains are vulnerable to a host of natural and anthropogenic threats, including seismic hazards, fire, climate change, land cover change and agricultural intensification, infrastructure development, and armed conflict. These pressures degrade mountain environments and affect the provision of ecosystem services and the livelihoods of people dependent upon them. The fragility of mountain ecosystems represents a considerable challenge to sustainable development, as the impacts of



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unsuitable development are particularly intense, more rapid and more difficult to correct than in other ecosystems.

In response, the Conference of the Parties to the Convention on Biological Diversity adopted the programme of work on mountain biological diversity in 2004, as a set of actions addressing characteristics and problems that are specific to mountain ecosystems. The programme of work aims to conserve mountain biological diversity and maintain the goods and services of mountain ecosystems, and to contribute to poverty alleviation and the achievement of the Millennium Development Goals. Underlying the goals of the programme of work is the belief that sustainability will be achieved in mountain areas by reducing poverty, inequality, and marginality, preventing deterioration of natural resources and environments, and by improving the capabilities of institutions and organizations to promote the conservation and sustainable use of biological diversity.

The melting glaciers, the shifting of natural habitats, and the retreat and sometimes disappearance of species are stark reminders of the vulnerability of mountains ecosystems to rising temperature and precipitation changes. Activities that link upland and lowland management strategies can provide adaptation options. These options *inter alia* include mountain watershed management, establishment of both horizontal and vertical connectivity migration corridors, rehabilitation of degraded ecosystems, avoiding deforestation, and reducing human pressure on biodiversity. The CBD programme of work on mountain biological diversity provides for such adaptation options and its effective implementation is of paramount importance to minimize the adverse effects of climate change on mountain ecosystems.

Achieving environmental and human sustainability in mountains means finding ways to manage mountain resources and systems so that they can provide critical ecosystem services. There are win-win opportunities in this arena to not only protect mountain ecosystems and the biodiversity they harbour – but to use these more proactively and wisely to contribute significantly to meeting multiple human development challenges in the face of a rapidly changing world.

The United Nations General Assembly has designated 2010 as the United Nations International Year of Biodiversity. I cordially invite all governments and organizations present to commence preparations for this important event. In the same year the Government of Japan will host the tenth meeting of the Conference of the Parties (COP) to the CBD. In this meeting the COP will undertake an in-depth review of the progress made in the implementation of the mountain biological diversity programme of work. Prior to the tenth meeting of the COP, the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) at its 14th meeting scheduled to be held in May 2010 will consider the progress made in the implementation of the programme of work on mountain biological diversity.

These milestones present the opportunities to not only reflect on what we have achieved in relation to the 2010 target but more importantly to set out our vision and goals for the future. In this process the contributions of ICIMOD and the galaxy of international organizations such as Global Mountain Biodiversity Assessment, Mountain Partnership, Mountain Forum, and the Mountain Research Initiative have been and will be critical. All of you are true partners in the fullest sense. We have the opportunity to showcase how well we have worked together and lay down our road map beyond 2010. I have no doubts that this will be achieved and that together we can set the bar even higher for collaboration towards our shared vision.

I wish you a successful meeting and assure you of my strongest commitment to our partnership.

Annex 2 Programme

16th November 2008 (SUNDAY) Inaugural Session and Reception-Dinner at Hotel Soaltee Crown Plaza

18:30-20:00	INAUGURAL SESSION
	Welcome – Andreas Schild, Director General, ICIMOD
	Inaugural Speech: Biodiversity, Environmental Change and Regional Cooperation Initiatives in Hindu Kush-Himalaya - Bruno Messerli
	Inaugural Keynote Speech: Biodiversity Conservation in a Changing World: An Overview - Christian Körner
	Message: Biodiversity Conservation and Management for Enhanced Ecosystem Services: Responding to the Challenges of Global Change - Ahmed Djoghlaif
	Inaugural Remark: Convention on Biological Diversity : Mountain Biodiversity Programme of Work and 2010 Targets - Krishna C. Paudel
	MC: Ekabya Sharma
20:00-21:30	RECEPTION DINNER
17th November 2008 (MONDAY) Conference Hall ICIMOD	
08:30-09:00	REGISTRATION
09:00-10:00	PLENARY SESSION I Central Issues & Concerns
	Theme: Climate Change and its Implications for Mountain Biodiversity
	<ul style="list-style-type: none"> Biodiversity in the Himalayas - Trends, Perception and Impacts of Climate Change - Ekabya Sharma Global Change in Mountain Regions - Strategies for Biosphere Reserves - Thomas Schaaf
	Discussion
10:00-11:00	PLENARY SESSION II Central Issue & Concerns
	Theme: Biodiversity Management for Economic Goods and Ecosystem Services from the Mountains
	<ul style="list-style-type: none"> Biodiversity Goods and Services – Increasing Benefits for the Mountain Communities - Robert Zomer Ecosystem Services arising from Biodiversity - P.S. Ramakrishnan
	Discussion
11:00-11:30	TEA/COFFEE BREAK
11:30-12:30	PLENARY SESSION III Central Issue & Concerns
	Theme: Institutionalizing Long-Term Continuity in Mountain Research Programmes
	<ul style="list-style-type: none"> Hindu Kush-Himalaya - Current Status, Challenges & Possible Framework - Ram Prasad Chaudhary Global Change in Mountain Regions: Research Strategy and its Implementation - Gregory Greenwood A Global Long-Term Observation System for Mountain Biodiversity – Lessons Learned and Upcoming Challenges - Harald Pauli
	Discussion
12:30-13:30	LUNCH BREAK
13:30-15:30	TECHNICAL WORKING GROUPS (Parallel sessions) The conferees will participate in one of five parallel 'working group' sessions on sub-themes in which they will be asked to share their HKH regional experiences

	GROUP I: Climate Change Impacts on Biodiversity and Mountain PAs (Two presentations of 10 minutes each from the HKH region by Ghanashyam Gurung and R.K. Maikhuri will be followed by theme discussion)
	GROUP II: Land Use Change Trends and Impact on Mountain Biodiversity (Two presentations of 10 minutes each from the HKH region by Jianchu Xu and for global perspective by Eva Spehn will be followed by theme discussion)
	GROUP III: Wetland Ecosystem Functions and Services – Implications of Climate Change (Two presentations of 10 minutes each from the HKH region by Chaman Trisal and Kun Shi will be followed by theme discussion)
	GROUP IV: Balancing Biodiversity Conservation with Community Livelihoods (Two presentations of 10 minutes each from the Central Asian region by Libor Jansky and Global perspective by Thomas Schaaf will be followed by theme discussion)
	GROUP V: Biodiversity Transects and Transboundary Connectivity Approaches in Mountains for Long-term Monitoring and Regional Cooperation (Two presentations of 10 minutes each for HKH Biodiversity Transects by Nakul Chettri and Connectivity Approaches by Graeme Worboys will be followed by theme discussion)
15:30-16:00	TEA BREAK
16:00-17:15	PLENARY SESSION IV - Reporting of Group Work During this plenary session, the facilitators for the group discussions on the five sub-themes will summarise the discussions that took place in their groups on the HKH regional experience
	Group presentations and discussion/clarification
18th November 2008 (TUESDAY) Conference Hall ICIMOD	
09:00-10:30	PLENARY SESSION V Responses from Global Programmes
	This plenary session will give each of the global programmes an opportunity (10 min.) to respond to the HKH regional experiences by providing global perspectives and providing ideas and suggestions on how their particular programme can contribute. The background papers on the global programmes will have been circulated beforehand via the web and the audience is expected to be familiar with them. The presenters will be asked only to respond to the regional experiences and not to present the papers they have submitted. In their responses the global programmes will discuss how they are presently involved in the HKH and how they intend to respond to the challenges of the region, what they see as a role for partners and how ICIMOD can be involved.
	<ul style="list-style-type: none"> • EV-K2-CNR • Food and Agriculture Organization (FAO) • Global Observation Research Initiative in Alpine Environments (GLORIA) • Global Mountain Biodiversity Assessment (GMBA) • International Union for Conservation of Nature (IUCN) • Mountain Forum
10:30-11:00	TEA/COFFEE BREAK
11:00-11:40	PLENARY SESSION V cont'd. Responses from Global Programmes
	<ul style="list-style-type: none"> • UNESCO's Man and the Biosphere (MAB) Programme with its World Network of Biosphere Reserves • United Nations University (UNU) • Wetlands International (WII) • World Wide Fund - CEPF • The United Nations Environmental Programme (UNEP)
11:40-13:00	PLENARY SESSION V cont'd. Synthesis of Global Programmes' Responses and Synthesis of HKH Institutions' Reaction
	<ul style="list-style-type: none"> • Presentation of Synthesis - Martin Price and Robert Zomer • Reactions from the HKH Institutions and ICIMOD
13:00-14:00	LUNCH BREAK
14:00-15:30	PLENARY SESSION VI Strategy and Way Forward
	<ul style="list-style-type: none"> • Strategy on 'Development of Coordination and Cooperation for HKH' (Plenary discussion, inputs and common elements defined period) • A Way Forward
15:30-16:00	TEA/COFFEE BREAK
16:00-17:00	CONCLUDING SESSION
	<ul style="list-style-type: none"> • Remarks by a HKH Region Representative • Remarks by a Global Programme Representative <p>Concluding Remarks:</p> <ul style="list-style-type: none"> • Andreas Schild • Bruno Messerli <p>Vote of Thanks, ICIMOD</p>

Annex 3 List of Participants

International

Rod Atkins, Australian Alps national parks Co-operative Management Program, Australia
 Yuri Badenkov, Russia
 Chris Baker, Wetlands International, The Netherlands
 Vladimir Bolshakov, Russian Academy of Sciences Ural Division, Russia
 Bernhard Wolf Dickore, University of Göttingen, Germany
 Daniel B. Fagre, US Geological Survey, USA
 Gregory Greenwood, Décanat, Faculté des Géosciences et de l'Environnement Amphipôle, Switzerland
 Falk Huettmann, University of Alaska, USA
 Libor Jansky, United Nations University, Germany
 Christian Körner, University of Basel, Switzerland
 Douglas McGuire, Mountain Partnership Secretariat, FAO, Rome
 Bruno Messerli, University of Bern, Switzerland
 Harald Pauli, GLORIA, University of Vienna, Austria
 Martin Francis Price, Centre for Mountain Studies, UK
 Thomas Schaaf, UNESCO's MAB Programme, France
 Subrata Sinha, UNEP
 Eva Spehn, University of Basel, Switzerland
 Susanne Stoll-Kleemann, University of Greifswald, Germany
 Gianni Tartari, Water Research Institute-CNR, Italy
 Graeme Worboys, IUCN, World Commission on Protected Areas, Australia
 Tatjana Yashina, Katunskiy Biosphere Reserve, Altai Republic Russian Federation

HKH Region

M. Khairul Alam, Bangladesh Forest Research Institute (BFRI), Bangladesh
 Siddhartha Bajra Bajracharya, National Trust for Nature Conservation, Nepal
 Ukesh Raj Bhujju, Nepal National Committee of IUCN Members, Nepal
 Muhammad Bashir Butt, MINFAL-AJK, Pakistan
 Gabriel Campbell, The Mountain Institute, Nepal
 Ram Prasad Chaudhary, Tribhuvan University, Nepal
 Ghanashyam Gurung, WWF-Nepal Programme, Nepal
 Karma Jigme, Ministry of Agriculture, Bhutan
 Sarala Khaling, WWF Nepal Programme, Nepal
 Ashiq Ahmad Khan, WWF-Pakistan, Pakistan
 Sudibya Kanti Khisha, CHTRDP, Bangladesh
 Tara Lama, Local Initiatives for Biodiversity Research and Development, (LI-BIRD), Nepal
 Ruijun Long, International Centre for Tibetan Plateau Ecosystem Management, P.R.China
 R.K. Maikhuri, G.B. Pant Institute of Himalayan Environment and Development, India
 L. M. S. Palni, G B Pant Institute of Himalayan Environment and Development (GBPIHED), India
 Ganesh Pant, Department of National Parks & Wildlife Conservation, Nepal
 Krishna C. Paudel, Ministry of Forest and Soil Conservation, Nepal
 Luo Peng, Chinese Academy of Sciences, P.R.China
 Palayanoor S. Ramakrishnan, Jawaharlal Nehru University, India
 R.K. Rai, Ministry of Environment & Forests, India
 G. S. Rawat, Wildlife Institute of India, India
 S. Venkata Reddy, Ministry of Environments and Forests, India
 Uday Raj Sharma, IUCN/World Commission on Protected Areas, South Asia, Nepal
 Naw May Lay Thant, Ministry of Forestry, Myanmar
 Win Naing Thaw, Ministry of Forestry, Myanmar
 Weikang Yang, Chinese Academy of Sciences, P.R. China

Xu Jianchu, World Agroforestry Centre, P.R. China
Xuefei Yang, Chinese Academy of Sciences, P. R. China
Yan Yang, Chinese Academy of Sciences, P.R. China
Yashmeen Tel Wala, University of Delhi, India
Zahoor A. Swati, Institute of Biotechnology & Genetic Engineering (IBGE) NWFP, Pakistan
Zhang Yuanming, Chinese Academy of Sciences (CAS), P.R.China

ICIMOD

Farooq Ahmad
Birendra Bajracharya
Nakul Chettri
Daan Boom
Mats Eriksson
Ambika Gautam (Afghanistan office)
Brigitte Hoerman
Ouyang Hua
Madhav Karki
Elisabeth Kerkhoff
Isabella C.B. Khadka
Michael Kollmair
Brigitte Leduc
Pradeep Mool
Beatrice Murray
Franciscus Neuman (Mountain Forum Secretariat)
Krishna P. Oli
Karma Phuntsho
Isabelle A. Providoli
Andreas Schild
Bandana Shakya
Eklabya Sharma
Arun Shrestha
Basanta Shrestha
Yan Zhaoli
Robert Zomer