

4 Key Achievements

ICIMOD's key achievements in terms of contribution towards sustainable development in mountain areas of the HKH region and in the context of its statutory functions are highlighted in the following.

A Multi-Disciplinary Documentation Centre

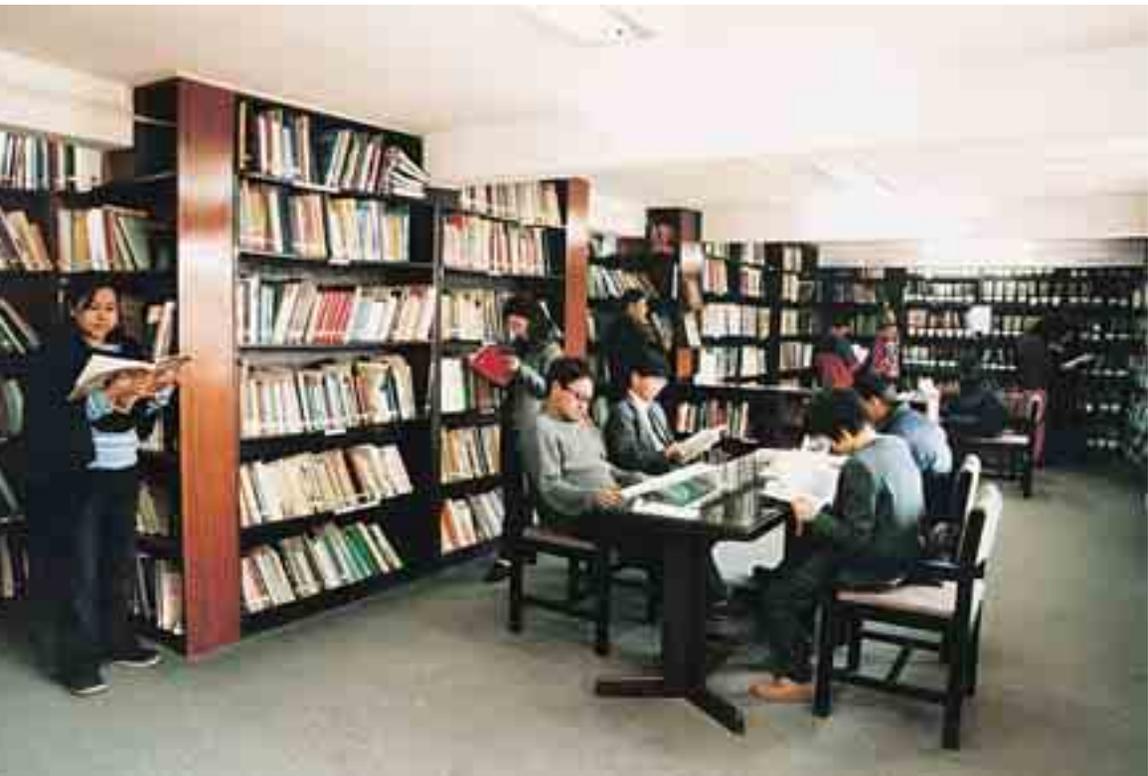
One of ICIMOD's primary functions is to serve as a multi-disciplinary centre for the systematic exchange of knowledge and information related to integrated mountain development. At the time of ICIMOD's establishment, information on the HKH region was scarce and dispersed. Since then ICIMOD has become the major documentation centre dealing with mountain development in the region. ICIMOD's library is playing an important role in collecting, classifying, cataloguing, indexing, and making accessible documents in different forms related to mountain development. ICIMOD's publications on knowledge and information generated by its own programmes and those of partners, on information collected based on needs, and on topics of current interest, make a critical contribution towards establishing ICIMOD as a 'knowledge bank' on integrated mountain development. In the past, attention was focused solely on traditional means and approaches of knowledge management. With the introduction of modern communication technologies, such as the Internet and CD-ROMs, information sharing and exchange have become easier and quicker, and the concept of information and knowledge management has expanded to include all the activities related to identifying, organising, packaging, making accessible, and sharing information and knowledge, including both developing and using methodologies, and building capacity in-house and among partners.

ICIMOD is a multi-disciplinary centre for the systematic exchange of knowledge and information related to integrated mountain development.

Documentation and Publications

ICIMOD published and distributed more than 800 technical and general publications between 1983 and 2005 in forms ranging from books and other printed publications to CD-ROMs, films, and Internet postings. These publications cover a wide range of issues related to integrated

Left photo: Measuring and documenting precipitation at a watershed site



ICIMOD Archive

ICIMOD's library plays an important role in the collection, cataloguing and making accessible of documents in mountain development

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mountain development. The documents are made available to ICIMOD's partners in member countries as well as to the information market at large. The information contained in these publications has been cited in a large number of documents that concern mountains and has been used by various partner institutes to support development activities including training and curriculum development. The publishing unit has assigned ICIMOD's own ISBN numbers through the UNESCO User Group network since 1991 and has an established and documented in-house style and processing procedure. It is often asked to publish for partners and donors through co-publishing agreements. This gives credit to ICIMOD's work and facilitates its value for policy development.

Dissemination and Outreach

ICIMOD disseminates publications to a wide audience through its PEP (Publications Exchange Programme) and CTR (Contribution to Resource Centre) agreements with libraries, documentation centres, and information units in partner organisations in the regional member countries (83 PEP and 37 CTR agreements at the end of 2005).

The Information, Management, Communications and Outreach Division (IMCO, now a part of the Information and Knowledge Management Programme) assisted HMGN in formulating an ICT policy for Nepal. It established the Asia Pacific Mountain Network (in 1994/95), the Electronic Networking project, and NepalNet, facilitated the establishment of the Central Asian Mountain Information Network (CAMIN) in Kyrgyzstan, and helped the Kyrgyzstan group promote 2002 as the International Year of Mountains (IYM). This was noted by the Secretary General of the UN in his preamble to the clauses declaring 2002 as IYM.

ICIMOD's library database currently contains nearly 30,000 bibliographic records, together with 1000 titles of journals and periodicals, and more than 200 videos, as well as other reference materials on mountain research and development. Information about these resources is accessible to outside users through the on-line CDS-ISIS and AGRIS databases.

More recently, IMCO commenced work on an information and knowledge management strategy and a framework for policy delivery in mountain natural resources (MNR) in the HKH. It was selected as a lead partner together with the Mekong River Commission (MRC) and the Association of South East Asian Nations (ASEAN) in the GTZ NeroAsia networking project, and is drawing up a proposal for a 'Mountain Knowledge Partnership', a scheme that will facilitate access to and distribute knowledge and information on the HKH contained in a large variety of knowledge objects to the region and worldwide. The unit has also been carrying out action research on alternative media for delivery of useful information on natural resource-use policies to the grass roots. All of these initiatives are expected to have notable impacts on policies in mountain development.



Narendra Bajracharya

An ICIMOD staff member briefs the public during an ICIMOD Open House.

A Focal Point for Training

One of the most significant areas in which ICIMOD has made a difference is in capacity building of partner institutes and their staff. Visible and acknowledged success stories include the human resource development of the Tibetan Academy of Agricultural and Animal Husbandry Sciences (TAAS); and training in geographical information system (GIS) and remote sensing (RS) technologies for land use planning in Bangladesh and Bhutan, in GIS/RS application for municipality planning in Nepal, in apiculture in Nepal, India, and Pakistan; and in participatory action research and co-management of rangelands in Bhutan, China, and Nepal, among many others.

ICIMOD has made a difference in building the capacity of RMCs and partners.

GIS and Remote Sensing Technologies

Among the most visible contributions of ICIMOD to mountain development is the promotion of the use of GIS and RS technologies and building the capacity of member countries. Almost all the regional member countries have benefited from this programme and many leading GIS experts in the regional member countries were either trained at ICIMOD or by ICIMOD in their own countries. The most significant successes have been in the Tibet Autonomous Region of China, Bhutan, Bangladesh, Myanmar, Pakistan, and the State of Himachal Pradesh in India. The national GIS/RS units can now use

ICIMOD's Alumni

ICIMOD's staff, recruited from among its regional member countries, have had a significant impact on the capacity building of partners. Many now hold important positions in governments, universities, and international agencies concerned with mountain development. They have been entrusted with important responsibilities as vice-ministers, heads of research and development institutions, vice-chancellors of universities, and employees of other international agencies, including the United Nations. ICIMOD's short training courses in various fields of interest, such as GIS/RS, gender mainstreaming, entrepreneurship development, beekeeping, watershed management, rangeland management, and others, have been instrumental in promoting innovative practices in these areas in different countries.

these technologies effectively for economic planning and policy development, natural resources uses, and infrastructure development schemes. A very recent example of this is the use of information from ICIMOD's publication *Districts of Nepal – Indicators of Development* by the Nepal Planning Commission to select six districts as priority areas for poverty alleviation programmes. Examples of other applications include land use planning in Bhutan with the Ministry of Agriculture; glacial lake outburst flood (GLOF) studies in Nepal, Bhutan, and Pakistan; and municipal planning in Lalitpur, Nepal.



Training with a women's group in Kotla, Himachal Pradesh, India

Through close contact and collaboration with research institutions, space and software agencies, and especially through strategic alliances with key GIS partners around the world, ICIMOD has developed and established a strong GIS network. Potential partner institutions continually request these services. A mountain GIS portal has been developed to share GIS resources over the Internet, providing a platform for sharing geographic data and knowledge using a common framework. GIS training for capacity building has been provided to 1,200 people from more than 150 institutions within and outside the region.

Capacity Building of Partner Institutions

ICIMOD has also been successful in capacity building in other disciplines in institutions where it is engaged in providing both long-term and short-term training of staff as well as basic support to partner institutions to apply the skills and knowledge acquired through training. In the Tibet Autonomous Region of China, it supported the institutional development of the Tibetan Academy of Agricultural and Animal Husbandry Sciences (TAAAS) through post-graduate fellowships as well as short-term hands-on training in agricultural research and extension methodologies. Today, TAAAS has become the focal point institution for any donor assisted research and development intervention and has the capacity to organise international meetings, liaise with national and international organisations, conduct pioneering research, and plan and implement projects of various types. Similarly, the Central Bureau of Statistics, the Department of Hydrology and Meteorology, the Department of Parks and Wildlife Conservation, Tribhuvan University, and many others in Nepal; the Policy and Planning Division and the Department of Geology and Mines in Bhutan; the Agricultural University of Palampur in Himachal, India; and the

Almost all the regional member countries have benefited from the use of geographical information systems and remote sensing technologies.

Department of Forestry in Myanmar were provided with support in various fields from GIS/RS application to participatory action research and the development of natural resources.

A Focal Point for Applied Research Development and Advocacy of a Mountain Perspective Framework

A major contribution from ICIMOD was the Mountain Perspective Framework.

Another major contribution from ICIMOD was the development and promotion of a conceptual and operational framework called the **Mountain Perspective Framework** that defines the uniqueness of mountain situations as a basis for designing and implementing integrated mountain development solutions for sustainable livelihoods and the environment. Put in simple terms, the MPF indicates recognition and consideration of the unique conditions of mountain landscapes that broadly differentiate them from other areas. ICIMOD focused on these conditions, described as mountain specificities, and their interlinked imperatives, to help identify and address the constraints and opportunities characterising mountain areas.

The mountain characteristics identified include a high degree of fragility, inaccessibility, marginality, diversity, specific niche opportunities, and human adaptation systems historically evolved by



Yaks, important livestock in the high mountains of the Himalaya for food, clothing, and transport

Ana Agustina Barros



Pema Gyamtsho

Mid hills settlement in Bhutan

communities to address the local imperatives. These conditions (with significant intra-mountain variations) not only shape the pace and patterns of change but determine the degree of relevance and effectiveness of development/welfare interventions in mountain areas. Most of the above characteristics have biophysical and socioeconomic or political dimensions, as well as interlinkages, which call for an integrated approach to the planning and execution of interventions in mountain areas.

The implications and impacts of the MPF can be viewed as different parts of a process directed towards a paradigm shift in the approaches to mountain development – from a sectoral to an inter-sectoral approach; from addressing technical to addressing social issues; and from macro to micro level issues. At the micro level, ICIMOD promoted the change process through on-the-job training of field researchers and people from different NGOs and government line agencies to use the elements of the MPF in their field level activities. At the macro level, ICIMOD highlighted the usability of the MPF in explaining the issues and potential approaches to address them in areas such as sustainable mountain agriculture and integrated national resource management; global environmental change (including climate change) together with

The Framework considers the unique conditions of mountains – different from other areas – in addressing constraints.

its drivers and possible responses; economic globalisation and the associated risks and opportunities; and the poverty-environment nexus as it relates to mountain regions.

More concrete examples of the use of the MPF in the policy process through ICIMOD's advisory input include:

- a) the preparation of an Action Plan for the Indian Himalayas by the Planning Commission, Government of India (1992);
- b) reorientation of the thrust of the Development Strategy for Tibet under Agenda 21 programmes, through the Department of Science and Technology for Social Development, the State Science and Technology Commission (PR China), and the Xizang Government agencies;
- c) preparation of an Agricultural Perspective Plan, by the National Planning Commission, HMGN (1993);
- d) agricultural diversification and livelihood project development strategies adopted by Uttaranchal State in India; and
- e) interactions with teams and individuals from Nepal and India preparing or planning for WTO's Doha meeting on economic globalisation with a special focus on the match/mismatch between the imperatives of mountain specificities and the structural and operational features of globalisation induced processes (2001 and 2002).

ICIMOD continues to be a major force behind people-based management of natural resources.

Community-based Management of Natural Resources

ICIMOD continues to be a major force behind the movement towards the development and practice of community-based management of

natural resources and networking related to it. It has supported and facilitated the growth of community forestry in Nepal, and of people-based watershed management and co-management of rangelands and biodiversity in Bhutan, and the Tibet Autonomous Region of China. One of the major successes has been in water-shed management.



Measuring water discharge in the Jhikhu Khola Watershed, Nepal

Watershed Management

ICIMOD started watershed management research in 1993 and expanded it into a regional network, the People and Resource Dynamics in Mountain Watersheds of the Hindu Kush-Himalayas Project (PARDYP). This work was initiated in response to concerns about the pressures on the resources and the people in the middle mountain areas of the HKH, particularly the marginalisation of mountain farmers; the use and availability of water; issues appertaining to land and forest degradation; declining soil fertility and the carrying capacities of the resource base; the speed of regeneration; and the ability of the natural environment to support the growing needs of the increasing population. The first phase of PARDYP (October 1996 – September 1999) was devoted to the establishment of the research infrastructure, human resources, and systems. The second phase (October 1999 – December 2002) was designed to enhance the community-based approach and to target poverty reduction and improved management of natural resources.

ICIMOD's work on watersheds responds to concerns about pressure on people and resources in the Himalayan region.

Some of the achievements of PARDYP are:

- substantial generation of information and knowledge on watershed management;
- incorporation of HYMOS software for storage and analysis of hydro-meteorological data;

Fish Farming

ICIMOD piloted a fish farming scheme in the Bheta Gad Garur Ganga Watershed in Uttaranchal State, India, in December 2000, under the PARDYP-India Programme, in collaboration with the G.B. Pant Institute of Himalayan Environment and Development, Almora. The purpose of the trial was to use ponds prepared for water harvesting to generate income as well as to improve the management and utilisation of water through an attractive income generating scheme for the poor farmers living within the watershed.

After just three years the income of poor farmers from fish farming had increased substantially, with reported net profits ranging from IRs. 1040 to IRs. 26,900 depending on the size and number of fish ponds. Forty farmers from 22 villages had embraced the technology and were operating around 61 fish ponds. Most of the farmers belong to poor, lower caste groups, which indicates that the scheme could be an effective means of addressing poverty and equity issues. This was possible because the technology demonstrated was cheap and simple and thus easily learned and affordable. The approach is now being extended to other watersheds.



Fish pond in Bheta Gad Watershed, India

Roger Whita

ICIMOD introduced sloping agricultural land technology to the region as an environmentally sound and economically attractive farmland practice.

- increased involvement of people in the management of common property resources leading to major changes in governance and access regimes;
- substantial contribution to the advancement of community forestry management in Nepal through its demonstration sites at Jhikhu Khola and Yarsha Khola;
- incorporation of fish farming in watershed management in India through its demonstration site at Kausani, Uttaranchal;
- wide scale adoption of water harvesting practices in China through its demonstration site in Baoshan, Yunnan Province;
- integrated fruit production on arid sloping lands in Pakistan through its demonstration site at Hilkot, Mansehra District; and
- regional exchange of methodologies and analytical frameworks for sustainable watershed management.

Sloping Agricultural Land Technology

Sloping agricultural land technology (SALT) has been one of the most promising, environmentally sound, and economically attractive packages of sloping farmland practices introduced to the region by ICIMOD. Experience with SALT had been gained earlier, following visits and training in the Philippines where SALT has been implemented for many years. In this system, dense hedgerows of fast growing perennial nitrogen-fixing tree or shrub species are planted along contour lines thus creating a living barrier that traps sediments and gradually transforms the sloping land into terraced land. The hedgerows both

markedly reduce soil erosion and contribute to improving and/or maintaining soil fertility. Regular pruning of hedgerows provides biomass for mulching and improving soil properties.

SALT has been tested in six of the ICIMOD member countries, including extensive trials in China in Sichuan, Guizhou, and Yunnan Provinces. In Ningnan County alone, about 10,000 farmers have adopted the technology in one form or another; altogether around 2000 ha of land in five counties in Sichuan



Trial plots for sloping agricultural land technology at ICIMOD's Demonstration and Training Centre at Godavari

ICIMOD Archive

Province have been covered under this land use system. In view of the high relevance and promising impact on the sustainable use of degraded sloping land, the Ministry of Science and Technology of the Government of the People's Republic of China has listed SALT as a key technology for environmental conservation. ICIMOD has prepared a number of publications on the technology including the proceedings of an International Symposium on SALT held in 2001, detailed results of trials at the Godavari Demonstration site, and a simple manual, which is available in a number of languages.

In Bhutan, India, Nepal, and Pakistan, trials are in progress to study the feasibility of SALT in different agroecological zones. One of the limitations of the technology is the space occupied by hedgerows, which leaves less room for crop production. Thus although very useful on marginal sloping land, it may sometimes compromise the food security of smallholder farmers.

More than half of the region consists of rangelands, a valuable mountain resource.

Rangeland Management

The Hindu Kush-Himalayan region, including the Tibetan Plateau, has a rangeland area of 2,060,000 sq.km or nearly 60% of the total



J. Gabriel Campbell

Rangelands are a welcome expanse of green in the overall rocky terrain of Afghanistan.

geographical area. Rangelands of various types represent an important natural resource of the region and are the main source of livelihoods for people through pastoralism. Besides livestock, the area supports a substantial diversity of wild ungulates (hoofed animals), and the pattern of development for pastoralism and rangeland use will greatly influence the conservation of a great variety of species.

Realising the importance of the rangeland resources in the HKH region, ICIMOD started working on rangelands in 1995. Based on the findings initial studies, a Regional Rangeland Programme (RRP) was developed and initiated in 1999. The goal of the programme is to reduce and eradicate poverty among rangeland dependent mountain people and to improve the productivity of rangeland ecosystems in the HKH region. The first phase (RRP-I) ended in December 2002 and the second phase (RRP-II) started in May 2003. The specific outcomes to date are summarised below.

The programme promotes a co-management approach that balances biodiversity conservation and socioeconomic needs.

- Documentation of the condition of rangelands in various parts of the HKH and description of the pastoral production systems, contributing to an improved understanding of the existing policies and practices and the specific research and development needs of the pastoral communities and the rangeland ecosystems. Since the programme began in 1996, 14 books on rangeland and high altitude livestock production have been published by ICIMOD representing a large pool of reference materials for rangeland management in the HKH region.
- Identification of suitable species for revegetation of degraded rangelands and for improvement of winter pastures in areas from the cold arid deserts of Mustang to the moist meadows in the eastern Himalayas.
- Training of a pool of range scientists and technicians from Afghanistan, Bhutan, Sichuan and Tibet in China, Ladakh in India, Mustang in Nepal, and Baluchistan in Pakistan in participatory methods of rangeland monitoring, planning and implementing of rangeland improvement and management measures with a focus on multiple-use and the co-management of rangeland resources.
- Increased understanding of the existing policies on rangelands, particularly in relation to tenural systems, and initiation of an active dialogue with the national partners concerned, on incorporating relevant changes to adopt a co-management approach that balances biodiversity conservation concerns with socioeconomic development needs.
- Better coordination and cooperation among national institutes dealing with rangeland issues; establishment of an active regional network of nine partner institutions in six countries.

The programme shows promise in positively influencing rangeland policies in the HKH region towards greater co-management and multiple-use management.

Mountain Biodiversity

In 1995, ICIMOD supported transboundary cooperation for biodiversity conservation and sustainable livelihoods in the Mt Everest ecosystem region in collaboration with The Mountain Institute, the Government of Nepal, and the Tibet Autonomous Region of China. The key transboundary issues considered were illegal poaching and trade in endangered species; the cross-border spread of forest fires; the cross-

ICIMOD, with partners, supported the first trans-Himalayan biodiversity conservation initiative in the region.



J. Gabriel Campbell

Sagarmatha National Park area

border spread of livestock disease; and improving local livelihoods. This was the first trans-Himalayan biodiversity conservation initiative in the region and it has shown ways for such cooperation that increasingly are being extended further east.



Beekeeping training in Nepal.

A significant contribution by ICIMOD to biodiversity conservation is its work on indigenous Himalayan honeybees.

ICIMOD expanded the Mt. Everest ecosystem experience to implement activities in other prospective transboundary complexes. Regional consultation on the Kangchenjunga ecosystem between India, Nepal, and the Tibet Autonomous Region, China, organised in 1997, strengthened the concept of transboundary cooperation. As a follow-up action, Nepal declared the Kanchenjunga Conservation Area on the Nepalese side while in Sikkim, India expanded the Kanchenjunga National Park to declare it a Biosphere Reserve. Now, ICIMOD in partnership with India, Nepal, and Bhutan has identified several corridors in the transboundary landscape of the Kangchenjunga. The process of transboundary cooperation between these countries has been initiated and is planned to extend to northeast India, Myanmar, and China.

Another significant contribution by ICIMOD in the area of biodiversity conservation is its work on the indigenous Himalayan honeybees, *Apis cerana*, *Apis dorsata*, and *Apis laboriosa*, which were considered threatened species. ICIMOD started this programme in 1991 with a project on 'Exploration of Genetic Diversity in the Himalayan Honeybee, *Apis cerana*'. The overall aim of this scientific research work was conservation of *Apis cerana* through development and promotion of beekeeping with this indigenous bee species. The research included studies on the status of beekeeping with *Apis cerana* in the HKH region, computer assisted morphometric and mitochondrial DNA analysis to identify different sub-species and the geographic distribution of this valuable genetic resource, research on the pollination ecology of vegetable seed production in the Kathmandu Valley, Nepal, behaviour and apiary management research to increase the productivity and efficiency of *Apis cerana* for better honey production, and pollination activities.

The research conducted on the status of beekeeping with *Apis cerana* in the HKH region revealed that this bee species is suffering precipitous decline and is threatened with extinction throughout its range, mainly because of its replacement with the exotic and more prolific *Apis mellifera*, habitat alteration, pesticide poisoning, diseases, and enemies, and particularly recurrence of sac brood virus disease. The non-hive cliff bee *Apis laboriosa* is also threatened by human predation, especially through extension of traditional honey hunting methods to use by commercial operators and for the entertainment of tourists. The decline in indigenous honeybee species is undesirable in terms of economic development, the productivity of farming systems, biodiversity conservation, and the carrying capacity of natural ecosystems.

The programme has achieved the following results which have significant environmental and economic implications both locally and globally.

- Generation of data and information on the genetic diversity and geographical spread of indigenous bee species in the HKH region.
- Successful advocacy on the importance of indigenous bees for the conservation of domesticated and wild plant biodiversity through their role as pollinators.
- Successful selection and breeding of queen bees and the multiplication of colonies.
- Tested methods to control Thai sac brood virus and other bee diseases.
- Aroused the interest of regional governments, the international donor community, and the Global Environment Facility (GEF) to finance national, regional, and global programmes to promote the conservation and sustainable management of pollinators including indigenous bee species.
- Established functional networks in beekeeping research and development, facilitated the exchange of information, and enhanced regional cooperation.

Mountain Tourism

Mountain tourism has distinct characteristics and many additional dimensions compared to tourism in the plains and other destinations. The fragile geological conditions, the physical inaccessibility, and the highly vulnerable mountain cultures and livelihood systems, pose many challenges to tourism development in mountainous regions. ICIMOD was one of the first institutions to study the problems and potential of mountain tourism as a means to alleviate poverty and conserve the fragile environment of the HKH.

The Centre was also one of the first institutions to study the potential of mountain tourism to alleviate poverty.



John Hummel

Heritage tourism such as in Bhutan is a growing tourism niche.

ICIMOD collects, documents, and replicates promising crops and practices such as the success of seabuckthorn in

China.

empowering local communities to plan and implement tourism related activities would be useful to influence sustainable tourism policies. Partner institutions field-tested training manuals developed by the programme, which were later discussed at a regional workshop before being finalised and disseminated. Three separate training manuals were prepared for policy planners, programme personnel, and local community groups.

The various documents and training manuals prepared by ICIMOD are used by different training institutions (e.g., Nepal Academy for Tourism and Hotel Management, Kathmandu, and Sarhad Rural Support Corporation (SRSC), Peshawar, Pakistan) and some overseas institutions and projects have requested permission from ICIMOD to use the manuals in developing tourism plans.

The Mountain Tourism Resource Centre at the ICIMOD Library has over 1,500 documents on mountain tourism, and on-line access to the bibliographical database through the ICIMOD website has proven useful in disseminating knowledge and information on experiences in and approaches to mountain tourism.

Recently, ICIMOD's initiative on tourism related to honeybee hunting was posted on the National Geographic website, where it was described as an innovative approach to promoting sustainable livelihoods and conserving bee biodiversity.

In 1994 ICIMOD implemented a series of studies through the project on 'Mountain Tourism for Local Community Development' in India, Nepal, and Pakistan in association with a variety of partners. An important finding of the studies was that, despite differences in the scale and type of tourism in the three countries, none had clearly defined policy perceptions of the role of tourism in mountain development. There was a general neglect towards linking approaches to tourism with local service production and delivery systems resulting in a high leakage of tourism generated income. As a result, it was recommended that

Gender Mainstreaming

In all of ICIMOD's work, gender dimensions have been considered in terms of how new policies, practices, and technologies should include gender relations and balance. ICIMOD's first gender cell was established in 1987 in the then Off-Farm Employment Division to look into off-farm opportunities and technologies that reduce drudgery for farm women, and the first international workshop on mountain women's entrepreneurship was held in 1988. A Gender and Development project was introduced into the Mountain Farming Systems Division at the inception of RCP-I (1995-1998). It trained a number of staff from key partner institutions and created a large network among ICIMOD partners. The initiative both assisted in large networks (Information Network for Women in Development [INWID] established by UNICEF's Production Credit for Rural Women) and established other new networks (Women in Land Use [WPLUS]). Other ICIMOD projects also took proactive gender mainstreaming initiatives to identify and create awareness of gender issues that are often pervasive but not highly visible among ICIMOD's regional member countries. For example, ICIMOD was heavily involved in the development of HIMAWANTI, a network of grassroot women, and has recently completed a project on Women, Energy and Water in three countries. However, developing and implementing a clear gender strategy and methodology continue to pose major challenges.

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Seabuckthorn Cultivation

Around 1991, ICIMOD identified a promising Chinese experience worthy of replication in other regional member countries. The Chinese successfully utilised seabuckthorn (*Hippophae rhamnoides* Linn), an indigenous mountain shrub, for multiple purposes such as fuelwood, food and drink products, vegetative control of soil erosion, increasing soil fertility, and as a raw material to encourage agro-industrial activities. Seabuckthorn berries were shown to contain more than 100 types of nutrients and bioactive substances useful for human health. Promotion of seabuckthorn provided multiple options for using fragile and marginal mountain land areas to supply low-cost vitamins, a rich source of cash income, and off-farm employment, and an effective means of slope stabilisation and soil moisture conservation.

ICIMOD collected and documented information on the uses and marketing of seabuckthorn and replicated the Chinese success story by initiating activities to promote the cultivation, use, and marketing of seabuckthorn in other HKH areas through:



Seabuckthorn

- preparation of a video film with Chinese cooperation to generate awareness;
- organising a visit by a mission from the Chinese office of seabuckthorn to ICIMOD; their visit to seabuckthorn growing areas in Nepal; exhibition of over a dozen seabuckthorn products; and a business seminar involving Chinese experts and participants from other countries;
- training of selected people from different HKH countries through field visits to China in 1992; and
- other initiatives, including research and development, and processing technologies, which formed part of the follow-up to the training phase.

Thousands of mountain farmers have increased their incomes through ICIMOD's promotional efforts.

In Pakistan, promotion of seabuckthorn has become a state supported programme. In the mountain area of Chitral, women's self-help groups have been formed and are now actively involved in the plantation of seabuckthorn to revegetate barren slopes. In India, a research centre on seabuckthorn was established at Solan University in Himachal Pradesh. Prior to this, seabuckthorn was considered a weed and prevented from spreading. In Nepal, large scale plantation was carried out with the support of the United Nations Development Programme (UNDP). In all these areas, processing plants for seabuckthorn berries have been set up and the products have entered the local markets. While figures are not available, the conservative estimate is that thousands of mountain farmers have benefited from the increased income accrued through ICIMOD's promotional efforts. High level delegations continue to seek ICIMOD's technical and facilitative assistance in continuing to promote regional plantation and use of this species.

Mountain Risk Engineering

In the Hindu Kush-Himalayan region, slope failures, road washouts, damage to irrigation canals, and debris flow on fertile lands have resulted in considerable loss of life and property. There is a need for a comprehensive, multi-disciplinary approach to mountain instabilities and for small, preventive control measures that give priority to appropriate, cheap methods and techniques based on local materials.

The Mountain Risk Engineering (MRE) Programme introduced by ICIMOD was a step forward in the process of addressing these problems through the integration of various disciplines. Under this programme, priority was given to on-site, on-the-job training activities targeted at junior in-service officers and professionals, supervisors, farmers, and village labourers. The training was conducted on site in four main phases over 70 days and trainees were exposed to the kind of mountain hazards faced by local communities and of interest to local public authorities. The curriculum included a body of applied



Li Tianchi

A railway bridge in Dongchuan, Yunnan, China damaged by a debris flow

knowledge and specific procedures with an overall orientation to sustainable, low-cost, small-scale civil and biological engineering.

The MRE Integrated Training Programme achieved a considerable degree of success. The programme strategy and operational structure were tested and proved to be congruous and effective with the programme's stated objectives. In particular, decentralisation of most of the activities to National Project Management Units proved effective and established the basis for the sustainability of the activities at the national level. Regional member countries are fully aware of the technology, particularly the bio-engineering manuals which are widely used in activities to prevent mudslides along roads. Follow-up workshops mainstreamed MRE aspects in GTZ, the EU, and Swiss supported rural infrastructure projects affecting thousands of kilometres of roads.

Flood and Disaster Mitigation

The Ganges, Brahmaputra, Meghna, and Indus flood plains are affected by floods every year. High rates of poverty and population growth have increased vulnerability to flood disasters. Flooding places severe constraints on socioeconomic development and investment in agriculture, infrastructure, and industrial production. The two major challenges are collection of the necessary high quality hydro-meteorological data in all parts of the major river basins, including in remote areas with limited infrastructure, and facilitating a system for exchange of this data in real time between the countries through which each river runs to enable adequate lead time.

ICIMOD introduced the Mountain Risk Engineering Programme to mitigate slope failure and other water-related disasters common in mountain areas.



Floods and natural disasters affect the poor the most; displaced flood victims in the Terai

Collection of quality water data and exchange of this data in real time are two key challenges.

The programme has so far been successful in bringing together high-level people working on flood forecasting and disaster management from the HKH countries to learn of current and new approaches and to discuss possible new directions for more effective collaboration. It has initiated and promoted dialogue between the upper and lower riparian countries and has brought together and involved senior high-ranking policy and decision makers. It has also been successful in continuing the dialogue towards promoting regional cooperation and has made a significant contribution towards building confidence and trust amongst the participating countries. This has indicated the success of effective partnerships among ICIMOD, the World Meteorological Organization (WMO), and collaborating institutions in each of the regional member countries as well as with donors and international organisations working with flood related programmes.

Renewable Energy Technologies

Development of renewable and affordable technologies for energy generation in mountain areas is another focal area of ICIMOD's work. Detailed case studies were carried out in Nepal on the suitability of various renewable energy sources including micro-hydropower, solar photovoltaic technology, biogas technology, bio-briquettes, and pica-hydel options. A manual was compiled on the installation and operation of various types of renewable energy technologies and used for training and promotion. These renewable green technologies have the potential to earn clean development mechanism (CDM) credit under the Kyoto protocol. ICIMOD has successfully influenced the adoption of some of

these technologies in rural areas of Nepal, Bhutan, and India. In remote areas like Solukhumbu and Mustang in Nepal, ICIMOD is actively promoting solar panels and bio-briquettes as alternative sources of energy to fuelwood and dung, which can greatly reduce the strain on natural resources.

Water Harvesting Technologies

Water is a critical resource in most mountainous areas. Often people have to cover long distances and take several hours to collect water for daily household use. ICIMOD has successfully packaged a range of water harvesting technologies including rain water harvesting, surface water harvesting using polythene sheets, and hydraulic water pumps and a bicycle water pump that have a tremendous potential for alleviating water shortage problems for consumption and agriculture, particularly when combined with efficient water use technologies like drip irrigation. Some of these technologies have been widely adopted by regional member countries, for example rainwater harvesting in Nepal and surface water harvesting with polythene sheets in Bhutan. ICIMOD has now developed a menu of water harvesting and storage technologies that can be promoted in different parts of the HKK region depending on local conditions.



Bikash Sharma

Collecting water from the roof

ICIMOD has packaged a range of water harvesting technologies to capture this increasingly critical mountain resource.

Fostering Networks and Partnerships

Working in a region, where geography, history, national priorities, and cultural distinctions restrain the emergence of a regional identity and cooperation, ICIMOD has made a significant contribution to fostering understanding and cooperation. It has facilitated the exchange of ideas among like-minded professionals and various interest groups and the cross-fertilisation of best practices from one location to another at national, regional, and even global levels. Some of the tangible outcomes of these efforts are discussed here.

Community Networks

FECOFUN

Today there is a general realisation that community forestry in Nepal exemplifies a unique and successful case of how, given the appropriate policy and legal environment, users can collectively organise themselves and manage natural resources. Now, only two decades since the programme was initiated in 1992, there are more than 8.5 million Nepalese engaged in more than 10,000 forest user groups that are directly involved in the management of over 1.1 million hectares of



Members of a community forest user group in Nepal

Elisabeth Kerkhoff

community forests in the country, according to the Federation of Community Forestry Users Nepal (FECOFUN). FECOFUN is the national association for community forest user groups in Nepal, founded in 1995. Its mission is to safeguard the natural and legal rights of forest users, to inculcate self-reliance, and to increase the decision-making capacity of forest user groups. FECOFUN has a multi-tiered structure with forest user groups organised in village development committee level networks (the lower administrative unit of Nepal), range post networks, district networks, regional networks, and a central network

(FECOFUN) at the national level. Today FECOFUN covers 74 of the 75 districts of Nepal. Since its establishment, this network has been instrumental in representing the concerns of community forest user groups in deliberations about policy regarding the rights of the community forest user groups. ICIMOD was actively involved in the evolution of FECOFUN from its inception period.

Api-Net Nepal

Api-Net Nepal is another milestone in the achievements of ICIMOD's indigenous honeybee programme. The establishment of this network was facilitated by ICIMOD in consultation with different sections of beekeepers and apiculturists. The network was registered in 2002; it brought together beekeepers, honey hunters, traders, and development professionals from all over Nepal. It facilitated a discussion forum related to honeybees, conservation, blossoms, honey, and honey markets. The network also publishes a biannual bulletin in Nepalese.

Regional Networks

Perhaps, one of the most important, but not always easy to assess, successes of ICIMOD, is in fostering cooperation among its regional member countries. ICIMOD is the only non-political entity that can bring together policy makers, scientists, development workers, civil societies, and farmers from the different countries in the region to discuss ideas, exchange experiences, and pursue common goals in various areas of mountain development. While political differences continue to persist among regional member countries, cooperation has been successfully cultivated in many areas. Successful examples are transboundary biodiversity conservation, flood forecasting and disaster mitigation, germplasm exchange, and study and exposure visits in

ICIMOD helped establish FECOFUN, which now covers over 1.1 million hectares of community forests.

various fields. The following paragraphs describe some of the formal regional networks supported by ICIMOD.

HIMAWANTI

The Himalayan Grassroots Women's Natural Resource Management Association (HIMAWANTI) is an independent, non-government organisation mandated to strengthen and promote the role of grassroots women in sustainable natural resource management in the countries of the HKH. Women participants from Nepal, India, and Pakistan formed a Regional Women's Community Forestry Users Group Network, which held a first planning workshop in Nepal in December 1995 with the aim of identifying problems of women user groups and evolving strategies for the future, especially an institutional mechanism for the network. The network was widened and renamed as HIMAWANTI.

The mission of HIMAWANTI is to ensure the emergence of appropriate policies and decision-making processes relating to programmes aimed at organising rural women and promoting their moral strength for the conservation and management of the natural resources of the HKH by giving priority to the rural women of the region.

Activities were designed and conducted to assist village women in the HKH to develop a small organisation of their own to facilitate regional consultation and empower women to create their own programmes and make their own decisions. In October 1999, after more than two years of planning and preparation, HIMAWANTI succeeded in bringing together more than 200 women from the region to a workshop entitled 'Focus on Grassroots Women in Natural Resources Management in the HKH', supported by ICIMOD. The aim was to provide a forum for grassroots women to share experiences and evolve strategies, and to strengthen communication and alliances among the rural women who are actually involved in conserving and managing natural resources. HIMAWANTI is actively functioning in Nepal and some parts of India but needs further support in other countries.

HKH-FRIEND

ICIMOD, in collaboration with UNESCO/IHP (International Hydrological Program), the WMO, and its regional member countries has been involved since the early 1990s in developing a better understanding of hydrological processes in the small watersheds of the HKH through the establishment of a regional network for hydrological research. It succeeded in launching the HKH-FRIEND (Flow Regimes from International Experimental Network Data) network in the HKH region in March 1996. HKH-FRIEND was officially endorsed by six of the eight regional member countries.

ICIMOD fosters regional networks in a variety of fields.



Glacial lake in the Everest region

The HKH countries are highly prone to floods of various frequency and magnitude, many of which cause heavy loss of human life and property. Several flood disasters in the past few decades have underscored the need for regional cooperation in sharing hydro-meteorological data and information to enable timely warning. Recognising this need, ICIMOD in collaboration with the World Meteorological Organization organised a high

level consultative meeting on 'Developing a Framework for Flood Forecasting and Information Exchange in the Hindu Kush-Himalayan Region' in Kathmandu, in May 2001. Participants from Bangladesh, Bhutan, China, India, Nepal, and Pakistan agreed on an Action Plan for Regional Cooperation for Flood Information Exchange in the HKH Region. A consultative panel has been constituted with high level representation from each of the participating countries to provide guidance and advice on the effective implementation of the collaboration. In collaboration with WMO, a website <www.southasianfloods.org> was launched to provide a means of sharing and disseminating flood related information.

The Centre has inventoried and mapped glacial lakes and identified potential for outburst floods.

ICIMOD has also successfully inventoried and mapped the glacial lakes in Bhutan and Nepal and identified the potentially dangerous lakes in both countries. ICIMOD is currently working on similar studies in China, India, and Pakistan. This has galvanised the governments to conduct further studies on the behaviour of glacial lakes and to take preventive measures at source and downstream including the installation of observation and wireless facilities. ICIMOD is currently conducting a similar study in Pakistan in collaboration with the University of Peshawar.

SAWTEE

ICIMOD established a strategic alliance in 2001 with the South Asia Watch on Trade, Economics and Environment (SAWTEE). SAWTEE is a regional network of South Asian non-government organisations (NGOs) committed to a mission of enabling South Asian communities to harness gains from globalisation and to mitigate likely negative impacts.

In 2001, ICIMOD together with SAWTEE, launched a new initiative on Farmer's Rights to Livelihoods in the Hindu Kush-Himalayas. ICIMOD's contribution was to facilitate the emergence of this new programme, which could address issues related to the impact of globalisation and liberalisation on mountain communities and mountain resources. ICIMOD was instrumental in designing the programme and leveraging financial resources for SAWTEE to implement it. This programme has made a significant contribution over the last few years and has now grown from what was originally envisaged as a regional network to a global network called the Farmer's Rights Advocacy Network (FRANK), which was launched at the World Trade Organisation meeting at Cancun, Mexico in 2003.

The programme is being implemented in the mountain areas through SAWTEE's five partner organisations: the Bangladesh Environmental Lawyers' Association (BELA) in Bangladesh; the Consumer Unity and Trust Society (CUTS) in India; the Sustainable Development Policy Institute (SDPI) in Pakistan; the Forum for Protection of Public Interest (Pro Public) in Nepal; and the Law and Society Trust (LST) in Sri Lanka.

SAWTEE has made a significant contribution by focusing on policy issues and mainstreaming discussions on the impact of globalisation on mountain areas, which was previously absent. SAWTEE has in the past and continues to organise regional workshops and forums and produces policy briefs, newsletters, and publications in print and on CD-ROM. It is currently launching the second phase of the programme in the Hindu Kush-Himalayas.

In 2001, ICIMOD together with a partner, launched a new initiative on Farmer's Rights to Livelihoods in the Hindu Kush-Himalaya.

Global Role and Networks

ICIMOD's reputation in the global arena has been steadily enhanced and recognised. It was actively involved in the development of Chapter 13, Agenda 21, for the Rio Summit on Sustainable Development in 1992. In 2002, it was one of the founding members of the Global Mountain Partnership launched at the World Summit on Sustainable Development (WSSD) in Johannesburg. It was assigned by the United Nations to be a lead organisation in the hosting of events to celebrate the International Year of Mountains (IYM) 2002, and successfully co-steered the Bishkek Global Mountain Summit besides other major events in the region including the Asia High Summit held in Kathmandu in May 2002, and Celebrating Mountain Women held in Paro, Bhutan in October 2002. ICIMOD contributed to the development of the programme of work on 'Mountain Biological Diversity' of the Convention on Biological Diversity for the decision made by the Conference of Parties at its 7th meeting in Kuala Lumpur in 2004. As an outcome, ICIMOD launched the Global Mountain Women's Partnership in Thimphu, Bhutan, and Bishkek, Kyrgyzstan.

Celebrating Mountain Women (CMW)

ICIMOD, in collaboration with the Royal Government of Bhutan, organised ‘Celebrating Mountain Women’, one of the first global mountain women’s conferences, held in Paro, Bhutan from 1-4 October 2002 to mark the International Year of Mountains (IYM) 2002. Despite mountain women’s predominant roles in primary sectors of economic development, they have little or no participation in policy, planning, and implementation. The Conference brought together over 250 mountain women and men from 35 countries and five continents with the objective of sharing experiences and aspirations, celebrating the drive and spirit of mountain women, discussing critical issues at hand, creating new coalitions, networks, and partnerships, improving and increasing media coverage, and searching for a new way forward.



Anupam Bhatia

Women wear costumes showcasing a mosaic of mountain cultural and historical traditions and highlighting their innovative spirit.

This global gathering was an attempt to recognise and draw the world’s attention to mountain women’s immense contribution to sustaining life in harsh and fragile environments, their roles and responsibilities, their rights as nurturers of their families and communities, and their capacity for economic and social contributions to the community.

The conference focused on five major themes: natural resources; health and well being; entrepreneurship; legal, political, and human rights; and culture and indigenous knowledge. The gathering created a space for shared learning. Mountain women shared their experiences and exchanged knowledge to shed light on gender issues from different areas of the world. As part of the celebrations, various informal activities and events were carried out that exemplified mountain women’s role in their respective societies. The mountain women’s costumes, displaying cultural and traditional aspects, were a living testimony of women’s exceptional talent and enduring spirit. Exhibition stalls displaying collections of arts, crafts, ceramics, clothing, food, herbs and spices, and other products highlighted the scope of mountain women’s innovative talent and entrepreneurial skills. The recommendations that came out of the group discussions were incorporated in the ‘Thimphu Declaration’ and later presented at the ‘Bishkek Global Mountain Summit’ (BGMS) where they provided the basis for the launch of the ‘Global Mountain Women’s Partnership’ (GMWP) with its objective to translate the demands of mountain women into action.

The Mountain Forum

The Mountain Forum is an alliance of regional networks that has successfully brought together existing networks to host a wide array of activities and bring lessons learned in the field into policy discussions at both national and international levels. ICIMOD is the home of the Asia Pacific Mountain Network (APMN), which it established in 1994/1995 under the Information and Knowledge Management programme. APMN is an informal on-line and off-line forum for information exchange and knowledge sharing on the sustainable development of mountain areas in the Asia/Pacific region among people and organisations working in or associated with these areas. It is now the Mountain Forum regional node for Asia and the Pacific. Since late 2000, ICIMOD has hosted the Global Secretariat of the Mountain Forum, and in late 2003 it incorporated the global information services of Mountain Forum, previously hosted by The Mountain Institute (TMI), into the Secretariat office.

Global Partnerships

The Global Partnership for Sustainable Development in Mountain Regions was officially launched on 2 September 2002 at the World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa. The Partnership is structured to ensure multi-stakeholder and longer-term approaches. In addition, it is conceived as an evolving alliance with the flexibility to address the complexity, diversity, and magnitude of mountain issues. ICIMOD has registered as a lead member for the initiatives on sustainable agriculture and rural development in mountains (SARD-M) and sustainable livelihoods, and as a member of the initiatives on gender, policy and law, research, and watershed management.

*ICIMOD hosts the
global Mountain
Forum Secretariat
– an alliance for
sustainable
development
around the world.*

