No. 50 Summer 2006

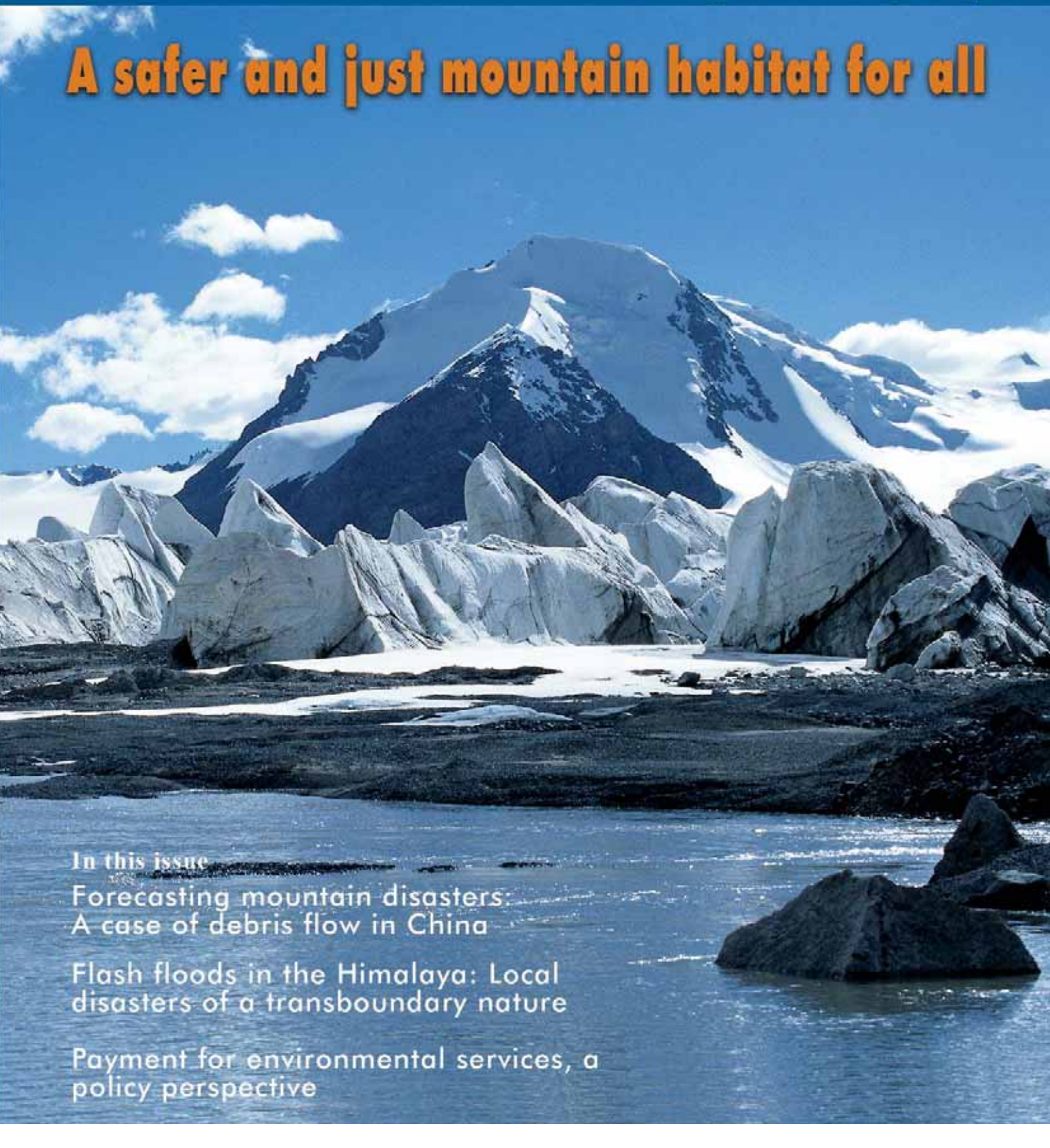
ISSN 1013-7386

International Centre for Integrated Mountain Development

SUSTAINABLE MOUNTAIN DEVELOPMENT

in the greater Himalayan region

A safer and just mountain habitat for all



In this issue

Contents

issn 1013-7386

Editorial Contact
ICIMOD Publications, imco@icimod.org

Guest Editor: Xu Jianchu; *Coordinator*: Nira Gurung, *Editors:* Joyce M. Mendez; Greta Rana *(Consultant)*
Design & Layout: Punam Pradhan, Dharma R. Maharjan

Printed by Sewa Printing Press, Kathmandu, Nepal

Cover photo Duojie Tashi: Scientists warn that melting of glaciers at unusually alarming rates due to global warming puts the lives and livelihoods of downstream populations of the Himalayan region at great risk from destructive flash floods.

From the Director General's desk...

Himalayan rivers provide roughly half of the water resources used by about half of the population of China, and South and Southeast Asia – over one-sixth of humanity. Agriculture, livestock rearing, forestry, industry, hydropower, and the household needs of these hundreds of millions of people depend on water from these mountain watersheds and the ecosystem services that mountains provide.

Unfortunately, the availability and flow of the Himalayan waters and environmental resources are often uneven and unequally distributed. Droughts appear to alternate with floods that occasionally erupt with a high potential for disaster. Deforestation and construction of large infrastructural installations change the dynamics of ecosystems. Mountain peoples live with substantial physical vulnerability to environmental forces such as water-induced disasters and earthquakes.

Unequal and uncertain access to water and other mountain resources also contributes to economic and social vulnerability. Climate change has increased the variability and scarcity of water resources. Together with global economic transformations, these trends appear to have also increased the potential for environmental disaster and polarisation between mountain and lowland areas.

As with natural disasters, the recent massive unrest in Nepal demonstrated the power of unleashed social forces to create large scale change that could have become either destructive or constructive. Fortunately, for those of us based in Kathmandu, it appears to have taken a strongly positive turn, just as we hovered on the brink of potential disaster.

This edition of the newsletter looks at the intertwining issues of livelihoods, vulnerability, and unequal access to and control over mountain resources. It seeks to move beyond perspectives that simplify understanding of local mountain peoples as either the primary causes of environmental vulnerability, or merely its victims. The newsletter also gives an account of the work that ICIMOD has been carrying out with its partners in the Hindu Kush-Himalayan region to document and understand sources of vulnerability and the roles local people play in mobilising their knowledge and skills for collective action to increase collective security on various scales – from local watersheds to multi-country river basins, from community forests to carbon trading.

ICIMOD has a responsibility to foster collective knowledge sharing and coordinated action. As the only regional institution bringing together the countries of Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – who serve as the sources of shared Himalayan rivers and environmental services – ICIMOD has been working to encourage new frameworks for technical cooperation among multiple stakeholders. Government agencies responsible for water and disaster management, and forest, energy, and applied research agencies and NGOs are the agents for providing scientific knowledge, communication mechanisms, training, and support facilities needed by local communities to mobilise their own formidable capabilities.

In addition, innovative policies and mechanisms are needed to create conditions for more equitable and effective livelihood options and environmental security. Increased regional cooperation on water resource management, fair trade in natural resources, new mechanisms of payment for environmental services provided by mountain dwellers, increased equity of access to mountain resources among mountain peoples and stakeholders, and better ways for mountain people to share knowledge among themselves provide us with a challenging agenda for action for some years to come.

We can create a safer and just mountain habitat for all. ICIMOD looks forward to working with our partners within and outside our Himalayan region to contribute to this fundamental goal.

Sincerely,
J. Gabriel Campbell

Towards a safer and just mountain habitat for all

Xu Jianchu, ICIMOD, jxu@icimod.org

Xu Jianchu

Deqin, a Tibetan town in Northwest Yunnan, China: an example of a densely settled mountain area

Mountains cover one-fifth of the globe, and are home to 1.2 billion or 20% of the human population. Half of humanity depends in one way or another on mountain ecosystems, as 60% of the planet's fresh water comes from mountains: their watersheds and river basins become both conceptual and political frameworks for examining the upstream-downstream ecological, economic, and social issues.

Mechanisms for extracting and distributing benefits from ecosystem services are a widespread concern. Concomitantly, new social actors, such as progressive NGOs and environmentalists and local communities and rights-based social movements, have appeared.

The Himalaya, or 'roof of the world', provide ecosystem services for almost half the world's population who live in the catchments of eight rivers, e.g., the populations of Bangladesh, China, India, and Pakistan. Changes in Asia have been rapid and dramatic with sustained high economic growth rates, urban-rural migration, urbanisation and rapid infrastructure development, increasing free-trade and regional integration, decentralised decision-making processes, and increasing public awareness about environmental conservation. Accompanying social changes have impacts on mountain ecosystems and local livelihoods in the Himalayan region, as well challenges such as increasing wealth gaps between rural and urban and upstream and downstream areas; increasing natural disasters, environmental degradation, and

pollution; and increasing poverty and social conflicts. Seventy per cent of the world's poor live in Asian mountain regions.

Climatically, however, the mountains are not 'isolated' from the rest of the world. In the past two decades, concern over the 'Theory of Himalayan Environmental Degradation' has given way to the potential impacts of global warming, a phenomenon caused by human activity. The mountains are victims of climatic change, because of their sensitivity to temperature changes and the vulnerability of their ecosystems.

Key features of mountain ecosystems are multi-functionality and vulnerability – the former signifying the diverse values provided to multiple stakeholders both upstream and downstream: fresh water, hydropower, irrigation, domestic water supplies, climate regulation, nutrient and soil replenishment, biodiversity, timber, medicinal plants, mineral resources, air/atmosphere regulation, tourism, pilgrimage, cultural services; and downstream linkages to different stakeholders – and the latter demonstrated by active tectogenesis with steep slopes, fragile bedrock, and a high rate of soil erosion.

Who cares for what?

Mountains have an abundance of fresh water for drinking, irrigation and hydropower, forestry and mining, as well as amenity services. Extractive industries value mountain ecosystems because their mineral resources generate revenue. Downstream extractors look for timber, non-timber products, and pharmaceutical companies gather valuable base material. Urban consumers like mountain 'niche' products. Tourists value natural beauty or cultural artefacts. Industries search for carbon offset in mountain forests. Dam developers take advantage of hydro potential, but big dams leave not only large ecological footprints because of submersion, but also displace many indigenous people from their homes, and hence cause heated controversies.

Xu Jianchu

The Chhukha Hydropower Project on the Wang Chhu River has a power generation capacity of 340 MW, providing 41% of the total national revenue of Bhutan.

Xu Jianchu

Mt. Kailash in Tibet Autonomous Region, China, a favourite of pilgrim travellers

Researchers collect hydro-meteorological data and specimens of flora and fauna. Some outsiders may help local people and the environment; others simply pursue their own interests.

The mountaineers, Tenzing Norgay Sherpa and Sir Edmund Hillary, successfully climbed Mount Everest in 1952, sparking tourism development in Nepal, and it became the country's biggest industry and a vital source of foreign capital. Pilgrims travel to Mt. Kailash in Tibet, nature tourists to watch wildlife in national parks or to see the mountains. Unfortunately, large influxes of tourists can have negative impacts on the ecosystems and cultures they come to enjoy. Benefits from tourism might accrue to the state or downstream stakeholders rather than to mountain people. Local labour might find work as porters, but national economic policies favour extractive industries over natural resources and services in mountain areas.

Pilgrims travel to Mt. Kailash in Tibet...but benefits from tourism might accrue to the state or downstream stakeholders rather than to mountain people.

In the context of conservation, by 2005, the Yunnan government had established 198 reserves with a total of 3.55 million ha, or 9% of the total area. Land developers establish resorts for amenity migration or plantation economies. Some activities can be highly beneficial for local communities, but there may be environmental, economic, and social costs such as distortion in distribution of benefits and deterioration of the ecosystem. It is difficult for development planners to predict all the positive and negative consequences.

Academic researchers, such as geographers, ecologists, anthropologists, and ethnobiologists, are interested in environmental changes, species adaptation, ecological evolution, and cultural and biological diversity in mountain regions. NGOs in the mountains have been engaged for a long time in poverty alleviation, conservation, rescue, and relief assistance. Some projects are for environmental conservation or development; others for helping local people in emergencies, and yet others are for research to influence governments and public opinion. Many NGOs are trying to develop integrated conservation and development programmes (ICDPs) in the Himalayan region: e.g., WWF, IUCN, Care International, and Action Aid. The significance of the Himalaya lies in the location upstream and climate warming and the global economy downstream. Increasingly local

Xu Jianchu and Mandira Shrestha

Bhutan woman and child: do they benefit from tourism and conservation?

Local communities are sometimes asked to provide indirect services such as monitoring and collecting hydrometeorological data and field experiments.

community based NGOs try to build bridges between local people and outsiders.

Outsiders are not the only ones interested in ecosystem services; locally, awareness of the economic and sociocultural value of mountain ecosystems is growing. Outside organisations are being approached about possible collaboration for improving services and commercially exploiting mountain resources and indigenous knowledge for local benefit.

As awareness about mountains increases, local people may be asked by downstream or neighbouring communities to provide better multiple-function services such as the following.

- Protecting ecosystems that supply water for drinking, irrigation, and hydroelectricity
- Reducing soil erosion and sedimentation in reservoirs, lakes, and river channels
- Conserving biodiversity in situ or on-farm
- Improving water quality by reducing chemical inputs and improving management of animal and human waste
- Producing mountain 'niche' products, non-timber forest products, and organic foods in traditional ways
- Maintaining biotic carbon through plantation and forest management

They might also be asked to provide the following indirect services.

- Monitoring and collecting hydro-meteorological data, species' performance, and other field experiments
- Field guides or porters for mountain climbers and tourists
- Indigenous knowledge of traditional use of plant and animal species, as well as about soils and minerals
- Traditional ecological knowledge on land use, environmental management, and ecosystem conservation
- Identification of biodiversity, habitats, mineral resources, and sacred and scenic landscapes
- Assessment and management of potential mountain risks and hazards for disaster reduction
- Demonstration of cultural services, handi-crafts, local arts, and performances

Local people and communities are becoming aware of the identity of outside visitors. Interactions with visitors can be beneficial but often end in frustration. Indigenous people can get useful information, broaden their knowledge, and collaborate in conservation, research, and development projects that provide monetary, social, and political benefits. On the other hand,

Xu Jianchu

Indigenous people are frustrated when their knowledge, interests, and needs are not taken into account in planning and implementing ecosystem management and development schemes.

local people may be faced with outsiders who intend to take advantage of them without providing benefits. In this respect, ICIMOD and other organisations can act as brokers between local people and outsiders.

Whose agenda counts? – the politics of power in uneven terrain

Many indigenous people become frustrated when their knowledge, interests, and demands are not taken into account in designing and implementing ecosystem management and development schemes: the benefits promised are often mere rhetoric. Outsiders often come on behalf of governments without sufficient consultation with local people. This situation is caused by inequitable power relationships between upstream and downstream stakeholders. Competitive demands on mountain resources and excessive resource extraction and improper development interventions from the lowlands reduce the extent and value of environmental services, and upland people are blamed. Land-use practices for positive outcomes entail emancipating local people and their knowledge. Community-based management and governance via decentralisation is one way to enfranchise local people so that local objectives are voiced and transformed into action.

Local people's aspirations and objectives compete with outside objectives. Given the uneven political landscape, they are unable to compete, their objectives are belittled, and their knowledge de-legitimised; hence, they internalise negative attitudes about their knowledge, interests, and objectives. Local claims on ecosystem services are ignored, while commercial interests exploit for profit. Hence it is essential to ensure that local people participate in decision-making about providing ecosystem services to downstream people.

Problems between upstream and downstream stakeholders lie in policies and regulations concentrating powers with outside actors; and this is partly because outsiders are empowered to make laws and hence laws favour downstream interests and demands. This imbalance in privilege and empowerment between subsistence activities and resource-based commerce results in indigenous people being marginalised.

Maximising highland-lowland complementarities of knowledge, interests, and objectives is crucial for both upstream and downstream communities. Healthy mountain communities increasingly link to lowland markets and lowland people depend on healthy ecosystem services maintained by mountain people. Globalisation connects not only markets but also ecosystems and people.

Building new relationships through transfer payments

Historically mountain communities have provided large quantities of goods and services to downstream communities as public goods, mostly for free (water) or at low prices (forest products). This is reflected in the unequal trade characterising highland-lowland economic linkages.

Depending on the perspective, mountains have both negative and positive aspects. The negative aspects are physical vulnerability with potential risks and hazards such as floods, soil erosion, mudflows, and landslides. These hazards either exist because of the mountain environment or their danger is greatly increased in mountain ranges and by climate change. The

positive aspects include the ecosystem services provided to local and downstream communities. Mountains also provide pathways for migration and trade. Therefore, the key mountain feature is dynamic multi-functionality, and hence their ecosystems and their people need to be perceived in a broader, regional setting. Nevertheless, historical upland-lowland linkages were shaped by political ideologies about land use and property rights centred on lowland urban areas. In the past, mountain areas were perceived by lowland people as sources of strategic resources for lowland development such as hydropower, timber, non-timber forest products, and minerals.

Chapter 13 of Agenda 21 draws the attention of state authorities to mountain issues, particularly deforestation and water catchments. Many countries in the region have implemented policies to increase forest cover, and have been successful despite population pressure and rapid expansion of industry: logging bans and afforestation in China, community forestry in Nepal, conservation through hydroelectricity generation in Bhutan, and joint forest management in India are examples. Today, mountain people do benefit from local ecosystem services through eco-tourism and small enterprise development. NGOs and civil society facilitate dialogue between locals and outsiders to secure payment for ecosystem services. Local farmers and herders in the Himalaya become global actors combating environmental changes.

The concept of 'ecosystem services' implies an automatic obligation on the part of the consumer or beneficiaries to pay directly for the service provided. Local peoples are part of the mountain ecosystem and play an important role in shaping and nurturing the landscape and its functions. Whenever communities are asked to maintain the ecosystem, they should find out before agreeing to cooperate what services will be provided, where, to whom, in what form, and how much compensation will be given for them. Ecosystem services from mountain regions should be valued: a) to support decisions-making in prioritising watersheds and ecosystems, b) to assess economic impacts of conservation and development interventions, and c) to develop new market mechanisms for ecosystem services.

A variety of policy choices are available for payment; whether payment is merited on moral grounds alone or based on market value or is a legally enforceable right depends on multi-stakeholder consensus, public and policy options, and the ability of the community to negotiate an agreement with downstream beneficiaries. Governments in the region have taken China through state subsidies for upland farmers to convert farmland to forest or grass cover, Bhutan through sector relocation of revenue from hydroelectricity generation, and Nepal and India through using royalties from hydroelectricity companies to benefit local communities.

Whenever communities are asked to maintain the ecosystem, they should ask before agreeing: what services will be provided, where, to whom, in what form, and how much compensation will be given for them.

A comprehensive payment scheme is difficult to formulate. What quantity of payment is just and realistic? What form should payment take? How can it be distributed fairly? Those are all open-ended questions. Payment will vary depending on a number of factors. It is up to the societies involved to determine whether an ecosystem service should remain free to the public, or whether markets should be created to capture some of that value and provide incentives for maintaining services. In most cases, outside facilitators may be involved in negotiating payment for the community, but will expect to receive a percentage of benefits, thus reducing the percentage received locally.

Does the form of payment reflect the needs and desires of communities or researchers' perceptions of the situation? Money may not always be the most useful form of payment. What is the ideal process by which benefits are negotiated or determined? It is a participatory process. Ensuring that payment is shared equitably between and within existing groups and future generations and that it reaches the actual service providers is a challenge. However, although the problem is complex, it is not insurmountable. Once ecosystem services are widely distributed, benefit-sharing is possible. Local communities should be aware of the importance of controlling resource access and property rights, as well as of improved ecosystem management practices. PES schemes can be sustainable in the long term if they are funded by local resources through fair and just negotiation between services providers and beneficiaries. Such negotiations can be facilitated by NGOs and INGOs depending upon the level: local, regional, transnational. Recently, ICIMOD, jointly with IUCN, tested rapid economic assessment methods for ecosystem services in Shivapuri National Park, Nepal. Multiple stakeholders both inside the park and downstream were invited to discuss trade-offs among multiple functions and services from mountain watersheds.

Living with risk through community-based management and regional collaboration

Mountain risks cannot be eliminated by human ingenuity, but human beings can reduce the possibility of occurrence and the consequences. With indigenous knowledge and new technology, risks can be managed through integrated catchment management, land-use planning, and forecasting and early warning. Mobility and social networks are examples of adaptation. Seasonal migration occurs when risks are greatest. Transhumance ensured that pastures were not overgrazed, thereby preventing erosion. Remote sensing and global positioning systems assist in mapping landslides, monitoring glacial lakes, calculating the probability of GLOF events, and assessing ground uplift and volcanic gas emissions.

These do not replace the watchfulness of mountain communities and their knowledge of environmental signs of impending disaster; nor do modern warning systems replace entirely traditional means of communication. Ancient guardian groups have become the forest user groups, the water user groups, and the waste management groups of today. In the mountains, there is a convergence of ancient and modern knowledge that strives to make the highest places on earth safer places to live.

Conclusion

Mountain habitats suffer both positive and negative impacts of human activities. Valued not only for the goods and services received downstream, but also for economic, livelihood, cultural, and spiritual values, mountains capture the imagination: the mountain environment more often than the people. However, capacity to respond to drivers and different scales of environmental change is limited. Support is needed from downstream and urban decision-makers. Local resources must be made accessible to mountain people for sustainable use and conservation. Livelihood strategies and opportunities must take pressure away from the limited land resources. The impacts of large-scale cash crops, livestock, timber, hydropower, and mining need careful control through ecosystem and environmental impact assessment. Notwithstanding, mountain dwellers have adapted and are adapting to habitats, hazards, vulnerabilities, and risks in some of the most difficult and violent terrain on earth.

Once ecosystem services are widely distributed, sharing of benefits is possible. PES schemes can be sustainable, funded by local resources through fair and just negotiation between service providers and beneficiaries.

Climate change and its implications for human health in the Himalaya

Mats Eriksson, ICIMOD, meriksson@icimod.org

Some scientists are predicting the melting of glaciers, a major source of fresh water resources which feed into the rivers of the Himalayan region, due to changes in climate.

Climate change and its effects on our environment are normally the territory of environmental researchers and climatic modellers. Recently other sectors too, like the health sector, have shown concern. To date, little information has been published on the possible health effects of global climate change in mountain regions. The increasing temperatures and changing precipitation patterns projected are likely to influence the region's ecosystems and human populations profoundly.

Our constantly changing climate

Since the Little Ice Age period, which peaked in the mid-late 19th century, global temperatures have risen at the rate of about 1°C because of both natural and anthropogenic causes. According to the Intergovernmental Panel on Climate Change (IPCC), the increase in global temperatures will continue during the 21st century as a result of greenhouse gas emissions. For South Asia, an above average increase is predicted. On the Indian sub-continent temperatures could rise between 3.5 and 5.5 °C by 2100. An even greater increase is assumed for the Tibetan Plateau. The anticipated effect on the environment and people's livelihoods in the Himalayan region could be substantial. The changes will certainly be complex and to date they are not fully understood. Therefore, there is an urgent need to study implications of climate and environmental change on people's livelihoods in the Himalaya. It is clear that the changes foreseen will affect the provision of Himalayan water resources.

The increase in annual mean temperatures will not cause the biggest problems for plants, animals, and human beings. Climate change is not just about averages, it is also a matter of extremes. Climate change is likely to affect minimum and maximum temperatures and trigger more extreme rainfall events and storms. For the Indian sub-continent, less rainfall in winter and increased precipitation in the summer monsoon are predicted; and in 2050 decreases in winter precipitation by 10-20% and by 30% for the summer have been projected. This means that we can expect an increase in droughts in winter and in floods in the summer monsoon.

In high altitude areas, an increased annual average temperature will cause thawing of perennial snow and ice. In the short term, this may lead to an increase in annual discharge in rivers, since a great proportion of river water comes from snow and ice. However, in the long run the annual discharge may decrease and the discharge in dry season decline, further limiting water supplies for communities downstream.

Several scenarios for climate change have been predicted for the Himalaya, but speculation is hazardous. Climate changes will interact with changes in plant communities and habitat. Changes in land use and vegetation are, and will be, a blend of ongoing natural and anthropogenic mechanisms. These changes in climate, vegetation, and land use in the region will have impacts on humans and their health.

Flash floods

Flash floods are events triggered by extreme rainfall, glacial lake outbursts (GLOFs), or the failure of dams caused by landslides or human activities. Thousands of people as well as crucial infrastructure are at risk annually.

Flash floods cause severe physical injuries, sometimes death. Vulnerable groups – the poor, women, and children – are often hit hardest. It is, to a great extent, communities in rural areas that suffer from floods, and distances to hospitals are considerable, aggravating the damage to humans.

Mountain communities struck by flash floods often face severe damage to property. Agricultural fields, livestock, and houses are swept away or damaged, leaving many villagers without sources of income. If land is washed away, many are unable to find the resources to replace it. Hence, they can be left without assets and may even become internally displaced people causing socioeconomic stress or health problems; although these negative effects on human health from disasters are seldom highlighted.

The increased precipitation predicted during summer monsoon for the Indian sub-continent is likely to increase the frequency and magnitude of extreme rainfall events, in turn implying a possible increase in severe flash floods. In addition climatic warming in the region will cause glacial meltdown, increasing pressure on moraine ridges damming highly elevated pro-glacial lakes, hence increasing the risk of GLOF events.

Water quality, water availability, and climate change

Today poor water quality kills more people than any other single factor. Worldwide, 1.5 million people die every year from water-borne diseases.

In arid Afghanistan nomadic herders face prospects of flash floods from erratic changes in climate.

In Nepal, it is estimated that 28,000 people, mainly children under 5 die annually from such diseases, e.g., diarrhoea, subsequent dehydration, and eventually death. That is a mortality rate of three persons per hour! In the Himalayan region, poor water quality is mainly related to lack of sanitation facilities and lack of awareness of the importance of proper hygiene in relation to water supply and sanitation. In rural areas defecation is commonly in the open, inevitably leading to contamination of water by pathogens. This vicious circle can only be broken by safe sanitation practises, preferably by introducing ecological sanitation and education about hygiene.

Changes in climate, vegetation, and land use in the region will have impacts on human health.

The problem of water quality may be exacerbated by climate change. The possible increase in differences between wet and dry seasons may imply wetter wet seasons and drier dry seasons. Already access to safe water is limited throughout the Himalaya. If dry seasons become even drier, this problem will grow, as it will increase pressure on existing water resources and force people to use water of poor quality: decreased access to water means being less able to maintain reasonable hygienic standards. As a result, the risk of water-borne diseases will increase.

Poor water quality kills more people today than any other single factor, and the problem may be exacerbated by climate change.

Other impacts on human health from climate change

Floods, access to safe water, and their impacts on human health are important areas in ICIMOD's mandate. However, there are other aspects to climate change in relation to health. One aspect is thermal stress and heat waves. Once temperatures increase beyond the comfort range of human tolerance, thermal stress will result in discomfort, physiological stress, ill health, or even death. Heat causes clinical syndromes, heatstroke being the most serious and occurring when body temperature exceeds 40.6 C. It is usually fatal. In a typical year, few people die from heatstroke. However, it is becoming clear that hot weather can increase the likelihood of dying from other causes. During heat waves in India in 1995 and 1998, it is estimated that death rates rose by several thousands.

Change in climate will also affect infectious diseases transmitted by insects, i.e., vector-borne diseases: examples are malaria, yellow fever, and schistosomiases. These diseases are sensitive to temperature as well as land-use changes, which may interact in a complex manner. The distribution of vector-borne diseases is restricted by climatic tolerance: a climatic change normally would affect the edges of current geographical distribution. Furthermore, land-use change and vector ecology control interactions between hosts and vectors, e.g., removal of vegetation or increased areas under irrigation influence the spread of diseases.

Conclusions

Mountain regions are predicted to encounter above-average climate changes caused by human activities; thus the implications for human health from the impacts of climate change need reviewing. Distribution of climate-sensitive diseases in the region need to be identified, relationships between climate and health quantified, and climate-sensitive health determinants and outcomes (with special emphasis on the most vulnerable populations) estimated. It is also important to identify adaptation measures to reduce future negative effects. While adaptive measures and interventions to protect human health from the consequences of climate change need immediate attention, mitigation measures, such as reduced greenhouse gas emissions, are vital. Countries causing the majority of emissions should recognise their responsibility for climate change and help mountain regions to adapt to it to ensure their long-term sustainability.

Flash floods in the Himalaya

Local disasters of a transboundary nature

Mats Eriksson, ICIMOD, meriksson@icimod.org
Juerg Merz, jmerz@gmx.net

Mandira Shrestha

Rampaging waters in the Jhikhu Khola watershed during a flash flood in 2002

Globalisation and improved media coverage constantly remind us how vulnerable we are to the forces of nature. Last year brought pictures and media reports of earthquakes, floods, and landslides from our region, and the term 'tsunami' gained common usage. A positive aspect of this is increased awareness among politicians and the general public of potential threats. We need to improve the capacity of society to adapt to, prepare for, and mitigate natural disasters.

South Asia ranks first in nearly all statistics related to water-induced disasters, particularly floods. Annually, the region records the highest number of floods, of people affected, of economic losses, and fatalities. Asia is not first, however, in the number of insured losses, hence resilience to these disasters in the region is low. Flash floods are gaining increasing attention. Inherent to mountain areas, they have three major origins. The most common is extreme rainfall. Short high-intensity rainfalls are common in the Himalayan region. They can cause a flood wave of disastrous proportions with potentially devastating effects within a very short time. Other causes are the breaking of man-made dams or dams caused by landslides. Mitigating the effects of landslides blocking rivers is generally difficult and expensive, but the situation can be monitored and early warnings can be issued provided the necessary information and communication systems are in place. A third and particularly pertinent problem in the Himalaya is the increasing numbers and sizes of pro-glacial lakes situated between an (often) ice-cored moraine ridge and a retreating glacier

tongue. Whenever such a lake breaks through the walls of its damming ridge, a glacial lake outburst flood (GLOF) occurs. Over two decades, ICIMOD has been at the forefront in mapping potential GLOF sites in the Himalaya.

Flash floods are mostly local events independent of each other and scattered in time and space. Typically, they have an extremely sudden onset and peak within minutes to hours, unlike normal riverine floods which peak only within hours or days. A surge wave can propagate quickly to locations tens of kilometres downstream, making them difficult to monitor and hence dangerous to mountain people, properties, and infrastructure.

In October 2005, seven countries of the Himalayan region met in Lhasa for the 'International Workshop on Flash Flood Management and Sustainable Development in the Himalayan Region' organised by ICIMOD in collaboration with the China Meteorological Administration (CMA) and the World Meteorological Organisation (WMO), with financial support from the Government of Norway and the USAID Office of US Foreign Disaster Assistance (OFDA). The purpose of the workshop was to assess the problems of flash floods in the region and how they can be addressed. Eight national studies were prepared from ICIMOD member countries providing a state-of-the-art situational analysis. Generally, the extent of the problem is difficult to assess. Reporting on flash floods is often integrated with riverine floods and many events are left unreported. It is clear that the problem is of considerable significance with probably thousands of fatalities and households affected in the region annually. The country reports indicated that the frequency and magnitude of flash floods will increase in the future. Although this assumption has to be confirmed scientifically, it might well be the case. For instance, in China, deaths caused by flash floods exceeded those caused by riverine floods in the last few years. China emphasises the need to address and improve management of flash floods and is the only country in the region that singles out flash floods in its disaster management approach. Other countries deal with flash floods with a multi-hazard approach. A review of the eight country reports shows great variability between countries in terms of approaches to flash-flood management. This variability is perceived as an opportunity for regional learning and exchange of experiences. Every participating country stressed the need to develop national disaster management strategies.

Xu Jianchu

The Mingyong glacier seen cascading downstream from a mountain in Yunnan, China. Glacial lake outbursts are the most common causes of flash floods.

Flash floods can happen suddenly, peak within minutes to hours, and spread tens of kilometres downstream – endangering populations, homes, and infrastructure in an instant!

The workshop – which was also attended by several international organisations: viz., the Asian Disaster Reduction Centre (ADRC) and the Asian Disaster Preparedness Centre (ADPC) – concluded that there is an urgent need for

Xu Jianchu

The Friendship Bridge in Bhote Kosi, at the border between Nepal and China: the early warning system needs to be extended across the border to provide adequate warning time.

improved forecasting and real-time warning mechanisms for flash floods within countries and regionally. Government and private stakeholders were urged to strengthen preparedness and response mechanisms, especially at community level. Specifically, the workshop carried out a comprehensive exercise to produce a set of conclusions, recommendations, and an outreach process to address flash flood management in the Himalayan region. This is referred to as the Lhasa Declaration and is available on request from the WHEM Programme of ICIMOD.

Six regional countries tabled the need to address flash floods as part of a project on regional flood management coordinated by ICIMOD. As much as flash floods are a national concern, they are also a transboundary problem because many rivers in the high Himalaya cross national boundaries. One of these rivers is Poiqu in the Tibetan Autonomous Region, China, which becomes the Bhote Kosi – Sun Kosi in Nepal. Several flash floods have occurred within this transboundary catchment: the latest took place in 1981 and caused immense destruction on the Nepali side, completely washing away a bridge and parts of the main road to Tibet (Arniko Highway) as well as triggering landslides. This is the main transport and trade route between Tibet/China and Nepal and on to India; hence damage of this kind has negative multiplier effects.

Since the 1981 flash flood, a hydropower station has been built on the Bhote Kosi (operational since 2001), serving the electricity needs of Kathmandu. Hence, the vulnerability of the catchment has increased. There are 140 glacial lakes in the catchment. A recent study in the catchment identified nine GLOF lakes to be potentially at risk of breaking through their natural moraine dams. For this reason, the Bhote Kosi Power Company installed an early warning system (EWS) upstream from the intake to the power station: a series of stream-level indicators are linked to sirens in the valley. So far so good, but EWS only covers the part of the river up to the border, a warning time of only 6 minutes! This is an inadequate amount of time for people to get to safety and secure property and infrastructure. The catchment of Poiqu on the Tibetan side has no EWS. This is mainly because of the lack of transboundary dialogue and common understanding on how to approach the problem of flash floods and increase the level of disaster preparedness.

The above example highlights the need for improved regional dialogue about how to address flood risk and disaster preparedness, in general, and flash-flood management in particular. National capabilities need to be strengthened to improve preparedness for and response to this precarious mountain hazard, and a regional approach and transboundary dialogue fostered to reduce the vulnerability of mountain communities. To meet these needs, ICIMOD has developed a project proposal to build the capacity for flash-flood management in the Himalayan region, both at national level and in a transboundary context. The discussions during the Lhasa workshop on flash-flood management and the outcome in the form of the Lhasa declaration show the commitment among countries in the Himalayan region to address this issue in a concerted manner in future.

Transboundary water resource management for flood mitigation: Experiences from the Hindu Kush-Himalayan region

Mandira Shrestha, ICIMOD, mshrestha@icimod.org

Mandira Shrestha

Floods (here in Nepal), damage homes, disrupt people's lives, and affect productivity.

Water is vital for survival: too little is life threatening, so is too much. Proper management is essential for water to be delivered where it is needed and mitigate the problems of over-abundance – like floods. Water is mobile and subject to great fluctuation, hence management is complex. In the Hindu Kush-Himalayan (HKH) region, seasonal variation in precipitation, with most of the rain falling during 4 to 5 monsoon months followed by scarcity, poses problems for water management.

Furthermore, most rivers in the HKH are transboundary and flow through several countries to reach the sea. Even though shared water resources have been a contentious issue in the past, flood management across national borders has become a catalyst for cooperation between and amongst countries in the region.

In recent years, 90% of natural disasters worldwide have been related to weather and climate; floods account for nearly 70% of the people affected in Asia. The impacts of natural disasters are most severe in developing countries. In each country, the national hydrological and meteorological services provide vital data on the vulnerability of society to water-related disasters and information warning of impeding disasters. To reduce the risk of water-related hazards like floods, the technical capabilities to predict and monitor their

magnitude, duration, timing, and location and to assess and reduce vulnerability are needed. A high-level transboundary river dialogue is also required to promote cooperation between countries and ensure a flow of data and information to help facilitate mitigation of flood disasters and tackle other issues of river flow.

Globally, the need for improved disaster management is gaining widespread attention, especially after the recent tsunami and earthquake in South Asia exposed the vulnerability and lack of preparedness. Regional cooperation is now seen to have an important role in disaster management in order to save lives and property because disasters do not respect political boundaries. These messages were clearly spelled out during the Asian Disaster Reduction Conference held in Beijing in September 2005 and the South Asian Association for Regional Cooperation (SAARC) meeting held in Bangladesh in November of the same year; as well as the need to establish early-warning mechanisms and disaster-response systems. The SAARC leaders called for integrated and coordinated efforts to face natural calamities and the need take urgent steps to manage disasters.

Annually, the Ganges, Brahmaputra, Meghna (GBM), and Indus river basins are affected by floods of various magnitudes and recurrence intervals. The GBM alone accounts for about 40% of South Asia's land area and almost half of its population. It is also one of the poorest regions in the world, home to 40% of the world's poor, with a rising population and environmental pressure. The water from these rivers provides the basis for life for more than 500 million people living in the basins; however, floods have detrimental impacts on the economy of the region and have resulted in loss of lives and property. Since July 2001, the International Centre for Integrated Mountain Development (ICIMOD) and the World Meteorological Organization (WMO) have been working on a long-term project to reduce flood vulnerability in the HKH region. The Project promotes the sharing of hydrometeorological data and information and is working to establish a regional flood information system. The first phase of the Project came to an end in December 2005. The Project was funded by the US Department of State Regional Environment Office for South Asia and United States Assistance for Development Office for Foreign Disaster Assistance.

Xu Jianchu

High altitude wetlands contribute to water storage and flood mitigation for downstream areas.

During the four-year period of the first phase of the project several high-level meetings were held to promote regional cooperation in flood disaster mitigation and to arrive at a consensus on establishing a regional flood information system. The project brought together high-level government representatives of national hydrological and meteorological services and organisations involved in flood-disaster mitigation from Bangladesh, Bhutan, China, India, Nepal, and Pakistan. It also involved international experts from WMO and the United States National Oceanographic and Atmospheric Administration (NOAA) as well as the United States Geological Society (USGS) and representatives from the implementing and funding organisations. So far, the project has contributed to strengthened regional cooperation and enhanced national capacity to forecast floods. The project has created a platform for exchange of knowledge, information, and technology (including international experts) while recognising the need to strengthen all elements of the flood forecasting and warning systems. The need for an end-to-end flood warning system to reduce negative impacts of floods has been incorporated into the forthcoming 2nd phase of the project.

The project succeeded in promoting regional cooperation and has gained support from five of the countries involved. India's full endorsement could not be confirmed during this phase, though the project has been successful in bringing India to all high-level meetings and discussions and, thereby, encouraging greater participation. In particular the project has facilitated exchange and dissemination data and information on floods, including real-time as well as historical data, national flood bulletins, and forecasting information. The project has shown that strengthening regional cooperation is a process that requires both political will and meaningful technical cooperation. Continuous technical cooperation among member countries through which trust and confidence can be encouraged is needed. Given the geo-political constraints to collaboration on water issues in the region, the degree of cooperation achieved through the project has been very satisfactory.

The project is in line with the Hyogo Framework for Action adopted during the World Conference on Disaster Reduction held in Kobe, Japan, in January 2005. As part of the key activity of the second priority area of the framework, regional and international cooperation is recommended as an appropriate means of assessing and monitoring regional and transboundary hazards, exchanging information, and providing early warning through appropriate arrangements such as those relating to the management of river basins.

Joint agreements on management of shared water resources are being put into place in many regions of the world, reflecting a growing concern for wise, sustainable management of shared waters. The Southern African Development Community (SADC) has been particularly successful, and several river basin organisations are in place under the umbrella of the 'Protocol on Shared Water Courses' – a joint document stating that the 14 SADC countries will collaborate in the management of all their shared rivers. Further north on the same continent, the ten countries sharing the Nile Basin are forming a dialogue platform under the Nile Basin Initiative and, in South East Asia, the Mekong River Commission is a prime example of basin-wide collaboration. The HKH region should look at ways to organise itself in a similar way to address transboundary water resource management for mutual benefit and cooperation. In this endeavour, an initiative like the "Regional Cooperation in Flood Forecasting and Information Exchange" has created an entry point into a new level of environmental cooperation in the region.

The HKH should organise itself along the lines of collaborating in the management of shared water resources for the benefit of all.

Towards sustainable use of the Brahmaputra

Dulal C. Goswami, Gauhati University, Guwahati, India, dulalg@yahoo.com

Xu Jianchu

Upper stream Brahmaputra River taken in Shigatse on the Tibetan Plateau, Tibet Autonomous Region, China

The Brahmaputra, the world's fourth largest river in terms of discharge at source, covers a drainage area of 580,000 sq km: 50.5% in China, 33.6% in India, 8.1% in Bangladesh, and 7.8% in Bhutan. Hence, it runs through diverse landscapes: the cold dry plateau of Tibet, steep rain-drenched slopes of the Himalayas, landlocked alluvial plains of Assam, and the vast deltaic lowlands of Bangladesh. The Brahmaputra with its heavy, variable flow, dense sediment load, and unique channel pattern also features drastic bank line changes and accelerated basin denudation.

Geo-environmental setting

The Brahmaputra basin has a unique physiographic setting vis-à-vis the eastern Himalayas: a powerful monsoon rainfall regime, a fragile geologic base, and active seismicity. The river begins at a great glacier mass in the Kailas Range south of Gunkyud Lake in southern Tibet at an elevation of 5,300m. From here it flows through China, India, and Bangladesh for 2,880 km before reaching the Bay of Bengal through a joint channel with the Ganges. The river gradient varies from 4.3 to 16.8 m/km in the gorge section upstream from Pasighat, but near Guwahati it is as flat as 0.1m/km. Together with anthropogenic factors, the basin's physiographic setting forms one of the world's most dynamic and complex fluvial systems, and it is one of the major biodiversity hot spots in the world.

Water resources and flood hazards

The hydrologic regime of the Brahmaputra responds to the seasonal monsoon and changes in the mountain snows. It carries more water per unit area of its basin than any other river in the

world, having an average annual flood discharge of 51,156 m3/s, with a maximum recorded discharge of 72,794 m3/s (1962). Globally, it is second only to the Yellow River in China in terms of the amount of sediment transported per unit drainage area. At Pandu (Assam), the Brahmaputra carries an average annual suspended sediment load of 402 million metric tonnes with an average daily rate of two million metric tonnes during monsoon (May through September).

The Indian northeast is drained by the Brahmaputra system which contains more than 30% of the country's total water resources and about 41% of the total hydropower potential, although only 3% of this potential has been tapped so far. The irrigation potential is very high, but compared to a total potential of about 4.26 million ha, the area presently under irrigation is only 0.85 million ha, or 20%: the Indian national average is 56.4%. Availability of groundwater at relatively shallow depths is also a feature of the region, especially in the valleys. However, less than 5% of the potential has been developed so far, much below the national average of 32%. The second largest waterway in India, its immense navigational potential remains almost unused. Thus, the water resources are fairly pristine and major development of them is yet to come.

In Assam, the river basin is notorious because of annual flood and erosion hazards that cause destruction, bringing untold misery to the people and shattering the fragile agro-economic base. In fact, with 40% of its land susceptible to flood damage, the Brahmaputra Valley here represents one of the most hazard-prone regions in India. Weak geological formation, active seismicity, accelerated rate of erosion, rapid channel aggradation, massive deforestation, intense land-use pressure, and rapid population growth, especially in the floodplains, along with ad hoc flood control measures, are the main factors causing and/or intensifying floods in Assam. The situation is exacerbated by myriad social, environmental, and economic factors.

This area of Assam suffered from major floods in 1954, 1962, 1966, 1972, 1977, 1984, 1986, 1988, 1998, 2000, 2002, and 2004. The floods in 1988, 1998, and 2004 were the worst in recent history. However, the flood in 2004 broke all previous records, affecting 28.5 million ha of land, 12.3 million people, 12.6 million ha of cropland, and 10,560 villages besides claiming 251 human lives and those of innumerable numbers of cattle and wildlife. Several tributaries suffered from drastic channel avulsion causing heavy erosion, extensive sedimentation, and severe flooding. Exceedingly heavy, incessant, and concentrated rainfall in the upper catchments, synchronisation of flood peaks in the tributaries and the main stream, breach of a natural dam upstream from Kurichu Hydel Project in Bhutan, and release of an excessive amount of water by the Kopili Hydel Project together with long-term human depredations in the watersheds were the major causative factors. Agriculture being the mainstay of most of the basin's inhabitants, existing water resources are underused. In view of the extensive flood damage to paddy fields, there is an urgent need to adjust the crop calendar by increasing cultivation of winter crops. Development of sustainable, localised irrigation facilities that safeguard environmental and social concerns is a prerequisite for any change.

The Indian northeast is drained by the Brahmaputra, which contains more than 30% of India's water resources.

Structural measures, mainly embankments, have been used so far as the sole measure against flooding. However, recently, breaching of embankments has been a major cause of intensification of flood hazards.

The Ministry of Power, Government of India, has identified 226 sites for large multipurpose dams on the rivers of Northeast India, most of these in the Brahmaputra basin. Some of them are in various stages of planning and development. However, there is growing concern

about the possible negative impacts of proposed mega dams in terms of their viability and sustainability vis-à-vis the geo-environmental base, ecological balance, ethno-cultural heritage, and the volatility of geophysical processes in the region. The wisdom of constructing big dams in the Himalayas raises questions that cannot be answered at the current stage of knowledge and development. The stakes seem to be too high and risks too great for such gigantic ventures which will have far-reaching consequences.

Looking ahead

The Brahmaputra is a challenge facing us in the new millennium. While little has been done so far to harness its immense potential for the benefit of the millions along its banks, the hazards caused by recurrent floods and erosion have multiplied, resulting in massive devastation. Unless a broader outlook, change of paradigm, proper philosophy of development, improved efficiency, and consolidation of commitments are pursued, the Brahmaputra will flow through the new millennium as a river of sorrow and despair, washing away lives and weakening the impoverished economy of the region. Rather than the ad hoc, piecemeal, and short-term structural measures adopted so far, an integrated basin management approach based on principles of soil and water conservation as well as sustainable development needs to be adopted. Solutions of a holistic nature, in which social, human and ecological considerations are given more weight than inappropriate structural solutions, are needed. For the Brahmaputra River with its diverse background such a plan will facilitate food security, health security, and ecological security, by harnessing the water for the welfare of society. Management of its water resources requires regional as well as international cooperation and pooling of resources and expertise at both national and global level. Strengthening the scientific and technical information base, application of the latest technologies and know-how, and introduction of alternative and appropriate strategies are other aspects that need to be emphasised. What is, of course, the greatest need is a strong political will at state and national levels and people's participation. Given these, the northeastern region, in particular, and India as a whole, could benefit immensely.

Xu Jianchu

The Chinese Government has promoted tree planting even in high altitude areas to promote conervation.

Upstream-downstream in the Himalaya

An old debate revisited

R.J. Wasson, bob.wasson@cdu.edu.au Charles Darwin University

Xu Jianchu

Kalula glacier in the Tibet Autonomous Region of China

In 1975, Erik Eckholm wrote a brief paper in which he presented his, today, well-known theory of Himalayan degradation. Among the claims he made was one stating that deforestation in the mountains was the cause of increased flooding in the Gangetic Plains of India and Bangladesh. Detailed criticism of this Theory of Himalayan Degradation (THED) followed (Ives and Messerli 1989; Ives 2004). THED became embedded in public policy in Nepal, India, and China, manifest in programmes of reforestation. The original and highly speculative paper by Eckholm had an impact that was disproportionately large (Blaikie and Muldavin 2004).

THED has also become an iconic example of an environmental myth. Thompson et al. (1986) argued that the scale of scientific uncertainty was so great that nothing sensible could be gleaned for public policy from the existing research. They argued, with a post-modern flourish, that nothing of value could be known about the complex of interconnected natural and human forces in the Himalaya. Stott and Sullivan (2000) use this as an example of a crucial aspect of political ecology where accepted environmental narratives are rephrased to a substantial extent.

The debate identified crucial deficiencies in research design. Flooding on the Gangetic Plain could be increased by increased runoff and/or by increased erosion leading to sedimentation in river channels, thereby decreasing channel capacity, all following deforestation. The runoff hypothesis has been thoroughly reconsidered by

Calder (2000). The deforestation-erosion-sedimentation-flooding linkage has not received renewed attention, but criticisms of the research design are generally well founded.

First, there has been no attempt to determine if river channel capacity on the Gangetic Plain has decreased, other than by inference from ratios of braidbars and active channels (Singh 1996). Even if this observation turns out to reflect reduced channel capacity, the relationship in the context of deforestation in headwater catchments is inferred rather than explicitly explored. In the Himalaya, the relationship between deforestation and erosion has been explored for the most part by using extrapolations from small catchment studies carried out in scattered locations in the mountains: the exception is a whole-of-catchment analysis by Starkel and Basu (2000). Comparisons between natural and human-induced erosion rates in the high and low mountains and the foothills have also been based on such extrapolations. This research design suffers from the problems of spatial representation of study sites, uncertainties in integrating over large areas, and from the difficulties of substituting for time differences in erosion response in small catchments with different land covers to estimate how erosion rates evolve following deforestation.

None of these comments refers to the criticisms of the reality and causes of deforestation, but these matters were well critiqued by Ives and Messerli(1989).

The basis of the contribution by Blaikie and Muldarvin (2004) is that THED had been discredited, and their question is why is public policy still based upon it? Part of the explanation lies in the views of local people and politicians. But whereas the critique of THED is largely scientifically sound, it does not imply that aspects of THED are incorrect. This is because of poor research design.

Recent work (Wasson et al.) has taken a different approach from that of previous researchers. First, we have not attempted to tackle all of the complex interrelated issues at once. We have begun by reviewing the evidence for deforestation in the Upper Ganga catchment, and the evidence for a link between deforestation and erosion. This is achieved by geochemically tracing the origin of river sediments over 6,000 years, a period that begins well before deforestation, and which can be shown to be commercially driven over the last 200 years. The sources of sediment are then related to the area of deforestation. This whole-of-catchment approach, resolved over an appropriately long period of time, has shown that the 1970 Alaknanda flood and sediment transport event – one of the causes of the Chipko Movement – can be attributed to deforestation great extent. Many other factors also play a role, such as topography, faults, roads, and rainfall.

It is clear that tools and methods are now available to re-visit this old debate. The current policy may be appropriate, but much of the necessary supporting knowledge is yet to be collected.

References

Blaikie, P.M.; Muldavin, J.S.S. (2004) 'Upstream, Downstream, China, India: The Politics of Environment in the Himalayan Region.' In Annals Assoc. American Geographers, 94, 520-548

Calder, I. (2000) The Blue Revolution. London: Earthscan

Eckholm, E. (1975) 'The Deterioration of Mountain Environments'. In Science, 189, 764-70

Ives, J.D. (2004) Himalayan Perceptions. London and New York: Routledge

Ives, J.D.; Messerli, B., (1989) The Himalayan Dilemma. London and New York: Routledge

Singh, M. (1996) The Ganga River: Fluvial Geomorphology. In Processes and Geochemical Studies, Heidelberger Beiträge zur Umwelt-Geochemie, Band 8

Starkel, L.; Basu, S. (eds) (2000) Rain, Landslides and Floods in the Darjeeling Himalaya. New Delhi: Indian National Science Academy

Stott, P.; Sullivan, S. (2000) 'Introduction'. In Stott, P.; Sullivan, S. (eds), Political Ecology: Science, Myth and Power. London: Arnold

Thompson, M.; Warburton, M.; Hatley, T. (1986) Uncertainty on a Himalayan Scale. London: Ethnographia

Wasson, R.J.; Juyal, N.; Jaiswal, M.; McCulloch, M.; Sarin, M.M.; Jain, V.; Srivastava, P.; Singhvi, A.K. (submitted) 'The Mountain-Lowland Debate: Deforestation and Sediment Transport in the Upper Ganges Catchment.' Forthcoming in Environmental Management

Water demand management

A solution to urban water supply

Klas Sandström, Akkadia Consulting, klas.sandstrom@akkadia.se
Mats Eriksson, ICIMOD, meriksson@icimod.org

Mandira Shrestha

Canal intake Karmaiya in Nepal, the canal provides water for urban irrigation

Is an ample supply of safe water a precondition for socioeconomic development and welfare? Yes, to a great extent, socioeconomic development in Europe being a prime example. However, development and socioeconomic security can also be achieved in countries where water is scarce. The prime examples are Israel, Saudi Arabia, and the arid states of Arizona and California in the U.S. In these countries and states, substantial investments in infrastructure, modern technology, and human and institutional capacity have compensated for desert-like conditions.

On the other hand, there are countries with wet climates and ample water resources which are still beset by severe poverty, e.g., Liberia, The Congo, and Myanmar. Even Nepal has large quantities of high quality water, but suffers from uneven distribution over the course of a year.

These examples indicate that hydrological conditions are not the only factor influencing development, but that the hydro-social cycle is also of great importance. This means the system prevailing in a country and determining the flow of water through society – how it is distributed, used, and shared among different groups. The factors that determine this are related to power, financial resources, and political will – factors that influence water governance and the successful (or unsuccessful) use of water resources. The international professional water community is increasingly relating the successful development of a country's water resources to the presence of good water governance.

Urban areas in developing countries are characterised by poorly maintained and only partly developed water distribution systems, often operated under conditions of weak governance. This normally results in very uneven distribution, in which people with power and resources have secure access to water while poor people pay a lot of money for unreliable access. It is an unfair situation, but it is not due to lack of water, it is a result of poor governance and corrupt systems. This paves the way for a variety of more or less innovative methods for getting access to water, that spring from self-interest. These may be illegal

Min Bajracharya

Rich in water resources but where's the water? This is a common sight in urban areas like Kathmandu in Nepal.

private connections to the main distribution pipes or the use of booster pumps to suck water from the pipes. The structural problems that force people to rely on 'innovative' methods in turn cause damage to the system, which in turn causes leakages and increases the amount of water wasted or not paid for, in turn reducing the water suppliers' income and opportunities for proper maintenance. In Delhi, for instance, 350 litres per person per day is currently pumped into the city – a huge amount!

Nevertheless, a significant proportion of the population has no access to water because the leakages are enormous, governance is poor, and maintenance insufficient. A recent study in India revealed that 41% of water users had paid bribes to manipulate the water meters and lower the bills, 30% paid bribes for repairs, and 12% to have extensions made. There is enough water on this planet to serve the needs of everyone, but mismanagement of water distribution at least partly explains why 1.1 billion people still have no access to safe drinking water.

Inadequate governance is aggravated further when there is little or no connection between who pays for the water and who uses it. This is the case in a suburb of Johannesburg, South Africa. Here, the leakage in the distribution system is about 75%; hence, only 25% reaches the consumers! But there is no incentive for the distribution company to reduce the leakages since they get paid for all the water pumped into the system by the central government and not by the consumers. The message here is that water is a commodity the consumer does not have to pay for, and it ensures continued waste of a precious resource. Unfortunately, this is not a unique example, but is rather replicated in similar fashion throughout many of the developing countries.

So, what can be done to improve the situations described? In most cases, there is enough water for urban use, if only it is used properly. The predominant solution applied throughout most of the 20th century, propelled by a cadre of water engineers with limited holistic approaches, was to look for new water sources as soon as there were signs of water scarcity. There is nothing wrong with building new dams and water tunnels in order to support economic growth and rising welfare, but it should not be applied as the first option if the distribution system is still wasting water and not delivering the services expected. When losses in the distribution system of a given city reach 70%, it makes little sense to add more water to that system. The solution is better found in improving the way available water resources are being used, so called water demand management.

By simply reducing leakages, improving water meters, and applying a just and fair tariff system

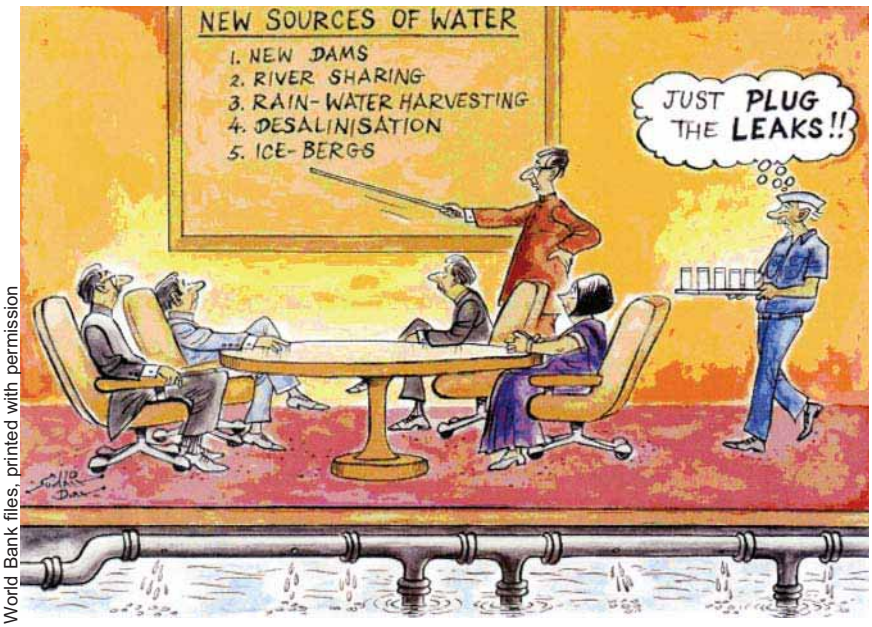
(preferably with a basic amount of water allocated to the poor at low cost), the situation can be turned away from disaster to a sustainable and just water distribution system in which the existing amount of water proves to be sufficient. The 350 litres of water that is pumped into Delhi per person every day is definitely enough - there is no need to add more water. But there is an acute need for improved governance of the water available. The concept of water demand management requires more than just an engineering plan to add more water from a new 'source'. It requires a more holistic approach in which several sectors of society cooperate, and in which the consumption of water is no longer viewed as simply a technological issue. There is a need for a people-centred, crosscutting, socioeconomic planning approach, which would open up vast opportunities for savings in expenditure on infrastructure and economic gains.

Mats Eriksson

Water is abundant but a just and sustainable distribution system is needed.

Are there any examples of such practices? Indeed, one need only look at Namibia – a dry country in south-western Africa. Here, 20 years ago, the water distribution in the capitol of Windhoek mainly benefited the wealthy minority of the city's population. Inappropriate water pricing assured over-consumption among certain groups, while the poor were constantly suffering from water shortages. Today, the population has doubled, but the same amount of water is still sufficient and is now serving the whole population

The leakage in the distribution system has been reduced significantly, and a progressive policy in the building sector ensures low wastage. In addition, 20% of the wastew*ater is reused as drinking water! Full-cost pricing of water has led to the most water-efficient industry in the world; for instance, only 3 litres of water is used for the production of 1 litre of beer – a world record. The cost of implementing this holistic approach, through the application of regulations and incentives for water conservation, was only a fraction of what the infrastructure for new sources would have cost. However, it required political commitment and strong, just governance. The revolution in water demand management, so badly needed in the urban areas of the developing world, is yet to come.



World Bank files, printed with permission

'This cartoon says it all.'

Forecasting mountain disasters

A case of debris flow in China

Fangqiang Wei, Institute of Mountain Hazards and Environment, Chinese Academy of Sciences

Xu Jianchu

This scene in Pakistan after the earthquake could happen in China or other mountainous areas in the region.

Mountains account for two-thirds of Chinese territory. Due to the monsoon climate (dense, concentrated rainfall), fragile mountain environment, and increasing human activities, the frequency and magnitude of mountain disasters such as debris flows and flash floods are increasing dramatically. Disaster management, planning, and decision-making can be improved by access to reliable forecasting of mountain hazards, weather, and potential disasters. We are experimenting with debris flow forecast, which is a widespread form of mountain disaster in China.

Forecasting is divided into extended-range, mid-range, and short-range depending upon the forecasting period, as well as forecasts for a region and for a given valley depending on the district. Among them, the regional short-range forecast is the most important because it gives a warning of debris flow in a specific region at a specific time. In order to develop a practical forecasting system, the Chinese Academy of Sciences and China Meteorological Administration is carrying out cooperative research on debris flow forecasting. The objective is to develop a regional short-range forecasting system based on numerical weather forecasts in southwest China.

Principle of debris flow forecasting

Three conditions are necessary for debris flow formation: energy (topography), unconsolidated debris material, and water sources. Energy is determined by relative height and slope. The magnitude of unconsolidated debris material is influenced by geology, land use

and climate, and so on. Water sources include rainfall, melt water from glaciers, and reservoirs. Because most debris flows are triggered by rainfall, rainfall is considered to be the only source here. In a large region, energy, unconsolidated debris material, and water sources can be considered to be basic conditions, because they are nearly invariable over a long period. However, rainfall varies every day; hence debris flow is the result of rainfall and therefore the principles of regional short-range debris flow forecasting are:

- monitoring and analysing the rainfall from the preceding period,
- predicting rainfall in several areas over 24 hours,
- assessing the probability of debris flow occurrence based on the rainfall conditions, and
- dividing a large region into small units to assess debris flows.

Rainfall conditions consist of quantity and intensity of rainfall, which together impact debris flow formation. To test the limitations of the rainfall forecasting method available, the maximum rainfall in one hour is selected as the factor indicating intensity of rain, although selecting half hour or 10 minutes is more effective. The quantity of rainfall is examined in two parts, as illustrated in Figure 1. A is the antecedent rainfall consisting of C (non-effective antecedent rainfall) and D (effective antecedent rainfall), and B is the expected rainfall consisting of E (expected effective rainfall) and F (expected surplus rainfall). According to this, the quantity of effective rainfall should be the sum of D and E. However, this should be defined as the sum of D and B in practice because there is no way of determining the point of debris flow formation.

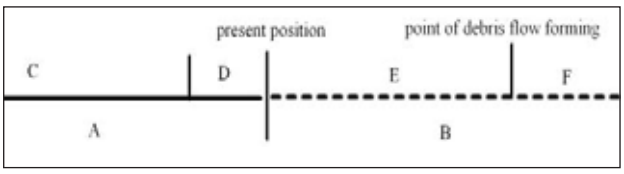


Figure 1: Illustration rainfall quantity

Methodology for debris flow forecasting

It is feasible to estimate the probability of debris flow formation during a future rainfall event in a region by setting up an assessment model which includes the main factors influencing debris flow formation. Based on the analysis above, six factors are chosen for assessing the probability: relative height (X_1), stratum (X_2), fault (X_3), land use (X_4), total rainfall (X_5), and rainfall intensity (X_6). Depending upon the behaviour of these factors, the probability of debris flow occurrence will differ: Bj (j=1,2,3,…,m). In order to determine probability, a standard matter-element model is designed as follows.

$$R_0 = \begin{bmatrix} B & X_1 & x_1 \\ & X_2 & x_2 \\ & \vdots & \vdots \\ & X_6 & x_6 \end{bmatrix} \qquad [1]$$

Where, x_1, x_2 and x_6 are the values of factors X_1, X_2 and X_6, respectively.

For any behaviour of the factor, R, in the standard matter-element model, R_0, the relevance between R and the behaviour corresponding to probability of debris flow occurrence, $K_j(P)$, can be calculated by

$$K_j(P) = \sum_{i=1}^{6} \alpha_i K_j(x_i) \qquad [2]$$

where a_i is the weight of factor X_i among the six factors, $K_j(x_i)$ is the relevance between the behaviour of factor X_i in R and the behaviour of X_i corresponding to the probability of debris flow occurrence in R_0. If $K_k(P) = \max_{k\in\{1,2,\cdots,m\}} K_j(P)$, the probability of debris flow occurrence is B_k.

Because the regional forecast is released to the public by the China Meteorology Administration (CMA), the result of a debris flow forecast is divided into five grade intervals (0-0.2, 0.2-0.4, 0.4-0.6, 0.6-0.8, 0.8-1) to meet the classification standards of CMA. The first and second grades are not released to the public and the third, fourth, and fifth grades are released to the public with yellow, orange, and red markers.

On the forecast scale, only total rainfall (X_5) and rainfall intensity (X_6) are variables, and therefore they are crucial for the accuracy of the forecast. One model of the numerical weather

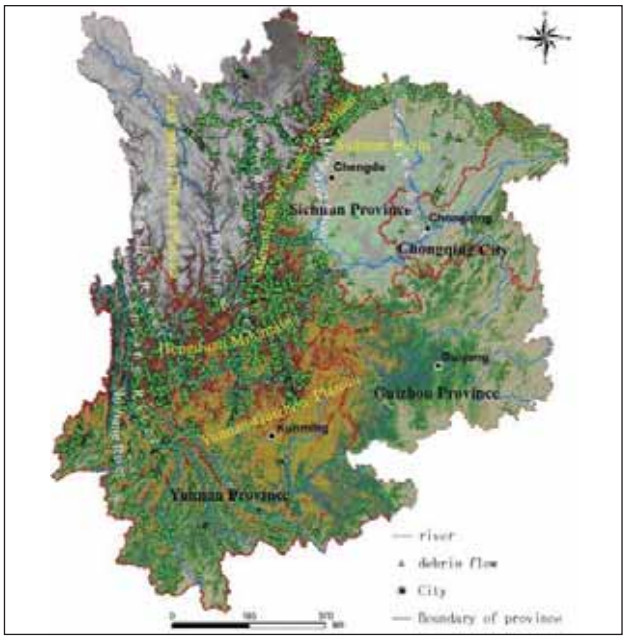


Figure 2: The study region and distribution of debris flow valleys

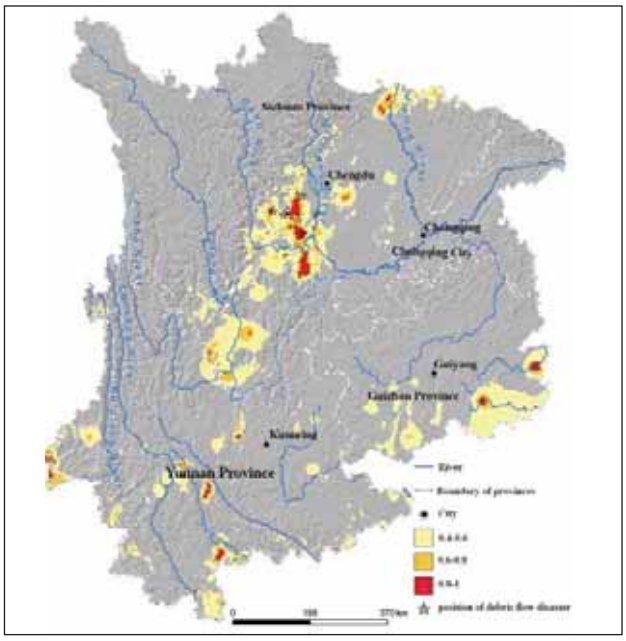


Figure 3: The result of debris flow forecasting on 29 June 2005

forecast provides a measurement for deriving X_5 and X_6: the WRF (Weather Research and Forecasting Model), a next-generation numerical weather prediction system designed to serve both operational forecasting and atmospheric research and developed by the National Centre for Atmospheric Research, the Air Force Weather Agency, the Naval Research Laboratory, Oklahoma University, and the Federal Aviation Administration of the USA. It features multiple dynamic cores, a 3-dimensional variation (3DVAR) data assimilation system, and software architecture allowing computational parallelism and system extensibility. WRF is suitable for a broad spectrum of applications across scales ranging from metres to thousands of kilometres, and it is run at the National Meteorology Centre of the Chinese Meteorological Administration (NMC).

Application of debris flow forecasting

The system has been developed for regional short-range forecasting and has five main functions: precipitation data processing, debris flow forecasting, mapping of forecasts, data maintenance, and file operation.

To test its accuracy, this system was run in the National Meteorology Centre of the Chinese Meteorological Administration in the rainy season from June to October 2005. A sample result is given in Figure 3.

Conclusions

The following conclusions are drawn from the analysis and the test run of the debris flow forecasting system applied to southwest China in the CMOC.

1. It is an effective method of regional debris flow forecasting at present: it estimates the degree of probability of debris flow occurrence by analysing the incoming rainfall and other associated factors comprehensively.
2. Numerical weather forecasting is the best way of arriving at a regional debris flow forecast from a rainfall forecast because the latter is relatively accurate and over a long period.
3. The result of the applied system is positive for debris flows induced by dense regional rainfall, but it is not good for debris flows caused by local rainfall or storm rainfall induced by locally concentrated, severe convection weather.
4. The data for antecedent rainfall monitored by meteorological stations set up in towns in river valleys cannot reflect the real distribution of antecedent rainfall, and interpolation analysis by ArcGIS may cause errors because it does not consider the influence of evolution variation. The errors influence the accuracy of debris flow forecasting. This problem must be resolved by other measurements in future research.

Emancipating indigenous knowledge

Can traditional cultures assist Himalayan sustainable development?

Xu Jianchu, ICIMOD, jxu@icimod.org
David Melick, Kunming Institute of Botany, Chinese Academy of Sciences, dmelick@mail.kib.ac.cn

Dipti Thapa

A herder (inset) and a rangeland in Bumthang, Bhutan – a picture of ecological balance

If everyone lived like the farmers and herders in the Himalayan region, there would be no greenhouse gas or energy crises. Indigenous people consume less from, and contribute more to, the ecosystem than urban dwellers with modern lifestyles. In mountain ecosystems there is a delicate balance between humans and nature. Forests are cut and regenerated, pastures are grazed, and lands intensively tilled; but traditional farming practices nurture useful species, protect forests, and maintain rangelands and waterways.

These systems are intertwined with cultural beliefs and mores that incorporate taboos, language, technical practices, knowledge transfer, and customary institutions of social consent and governance–cumulatively called indigenous knowledge (IK). Some knowledge is sacred, known only to initiates, and some is common within communities: it can be ancient tradition or recent innovation.

Rapid and dramatic changes have taken place in Asia: sustained economic growth has seen millions of people escape poverty, especially in rural China. Led by the emerging economic powerhouses of China and India, the system is in overdrive – not just in booming coastal mega-cities (e.g., Shanghai, Bombay), but in remote mountain regions such as Lhasa, Kunming, Shimla, and

Darjeeling. Change challenges traditional lifestyles, ethnic cultures, and IK. Accelerated resource extraction, land-use intensification, migration, and infrastructural development have eroded cultural values and IK, leading to deteriorating ecosystems. How can policy-makers and scientists work to rediscover and revive IK or coping strategies in a regional agenda to deliver better conservation and development outcomes?

The Yunnan Stone Forest, now applying for registration as a UNESCO heritage site

Linking culture and nature

China and India, together with ancient Egypt and Babylon, constituted the four great ancient civilisations. The rise of Hinduism, Buddhism, Islam, Confucianism, Taoism, and even Shamanism has shaped links between humans and nature for thousands of years – links that maintain sustainable resource use and conservation of natural and cultural landscapes. Among the better known examples of environmental protection are the sacred forests, lakes, and mountains maintained by groups on the borders of China, India, Nepal, and Bhutan. For many people in these ethnic communities, Mt. Kailash is worshipped as the centre of the universe. There are numerous other examples: headwater forests; sacred forest belts around villages; hills marking political boundaries and maintaining hunting habitats; as well as traditional sharing of water resources and trade between uplands and lowlands.

The link between culture and nature is not necessarily causal. Diverse landscapes and climatic variation throughout the Himalaya result in varied microhabitats, fostering rich biodiversity and multiple livelihood options. The remote province of Yunnan in the eastern Himalaya covers 5% of China's land, but contains over 60% of its natural biodiversity. Yunnan comprises rugged, parallel mountain ranges (exceeding 6,500 m) and deep gorges that run longitudinally down to the tropical zones of Southeast Asia. The same mountain ranges and gorges that allow adjacent floras to overlap have also maintained sufficient isolation between valleys to enable significant in situ evolution and development of cultural minorities. Of China’s 56 officially recognised ethnic minorities, Yunnan has 25.

Inequity of natural resource management

The famous Chinese novel, Romance of Three Kingdoms (220-265 CE), described Himalayan southwest China as a region of primitive people, wilderness, jungle, serpents, and disease. As a punishment, many dynasties deported criminals and exiled officials to Yunnan. To some extent this reputation persists and central governments have regarded these areas as primitive and inhospitable, good for natural resources but not much else. While mountain resources were pillaged, little wealth was generated locally. Recently, huge dam projects, large-scale logging, and mining have greatly affected local minorities.

Upstream peoples in the Himalaya are still blamed for environmental degradation and pay the price for overexploitation, often by downstream interests. The implementation of massive reforestation and watershed conservation programmes and the establishment of nature reserves often deny local communities access to their traditional land and livelihoods.

Policy-makers are aware that the mountain periphery is on the wrong side of the nation’s ever

widening poverty divide. Confronting this inequity, the Chinese government is pursuing 'Develop the West and Construct New Countryside' policies to bring new enterprises to remote regions as rapidly as possible. Immediate results are seen in the expansion of road and transport links, attempts to improve communications, and the development of tourist infrastructure. Significantly, these programmes aim to enrich the uplands, rather than exploiting them for the benefit of the lowlands. Yet the pace of change threatens the stability of minority communities; greater access, market exposure, and outmigration erode IK and communal institutions, leading to overexploitation of resources as communities attempt to cash in for short-term gain.

Rediscovering IK

The richness of traditional knowledge systems in Asia is well recognised. In recent decades interest in IK has revived, leading to some intriguing research partnerships. In China and India, ethnobotanists document IK with traditional healers and work alongside phytochemistry lab jockeys to isolate chemically active compounds with drug applications for malaria, anti-HIV herbal medicine, and bio-pesticides.

IK has value in its own right. Domestic tourism thrives from the allure of minority cultures in China. But, although IK is economically valued, it could be destroyed by its newfound popularity. A visitor to Lhasa today could be forgiven for thinking they had strayed into a Tibetan theme park. The name ‘Shangri-la’ was claimed by a county in northwest Yunnan, where it is sad to see old buildings demolished and replaced by new ‘mock old’ buildings.

Using IK can help find useful substances and create tourism opportunities, but, more importantly, re-introduction of traditional management values helps deliver effective and sustainable conservation. Indigenous people may not have created biodiversity, but they maintained it. Current conservation and sustainable development policies struggle to be effective in the Himalayan region, either because of poor science, conflicting aims, or lack of support. In southwest China, policies that promote reforestation at the expense of rangelands are, paradoxically, enacted hand in hand with attempts to increase livestock numbers in an effort to raise rural incomes. Moves to directly conserve sites by establishing protected areas can result in overexploitation by insecure locals who fear exclusion and loss of access.

Emancipating and using IK in a centralised world

IK practices are being reborn through community-based natural resource management (CBNRM) and participatory technology development (PTD). ICIMOD’s People and Resource Dynamics (PARDYP) project focuses on mountain watersheds, strengthening inter-community agreements on water access, soil and water conservation, and forest management. Sacred landscape management has been scaled-up in line with a regional agenda for biodiversity conservation and ecosystem security. These programmes are assisted by participatory research, mapping, and developing links between

Xu Jianchu

A busy Yunnan market

scientists and local communities. While there is success, effective incorporation of IK and an inclusive natural resource policy require widespread political support.

Flexibility and site specificity are needed to implement IK and improve resource management; but these require decentralisation, which runs counter to the centrally dictated policies prevalent in most Himalayan administrations. In China, such changes are currently part of the discourse on democratic reforms, building upon policies that give land-use rights to individuals. A recent organic village law is giving elected village councils some autonomy; but still, transfer of meaningful power is highly political, and in practice little has changed. Local authorities have not worked out whether they are representing the people who elect them, or still acting as administrators for the central state. They are caught between the incentives of elections and those of a powerful political administration that can make or break them as local authorities.

Land security is an obstacle to implementation of sustainable development.

IK is created through pragmatism: the necessity of finding the most efficacious livelihoods, and ethnic peoples' intrinsic wisdom should not be lost.

Regionally, a history of civil wars, conflicts, foreign occupation, and strict ideological, self-destructive policies has cast great doubt over land tenure and security. Despite recent reforms, land tenure remains obscure. The definition of community forests in China, for example, is baffling. Supposedly they should be under the control of local communities, although user rights may differ between or even within villages for different items.

Lack of security is not likely to foster far-sighted management. Communities have been known to fell their forests in fear of impending loss of access, while deforestation through areas of northern Laos is linked to the loss of land security during the civil war. Given a sense of ownership and security, local communities may be able to practice IK and use ecosystems sustainably.

The role of science needs to be reconsidered. Political drives to establish a scientifically-based plantation economy with rubber, tobacco, tea, and sugar cane came at the expense of shifting cultivation and wild species. Now many parts of Asia find themselves with a narrow agricultural base that is susceptible to market fluctuations – a new experience for Chinese state industries. The prevalence of new crop strains and monocultures has decreased agro-diversity substantially. Several Himalayan countries (e.g., China, India, and Bhutan) are spending large amounts of money establishing germ banks to preserve agro-biodiversity. Commendable it may be, but perhaps the money would be better spent supporting in situ conservation.

Romance versus reality

Although IK may be enlightened in comparison with modern environmental management, romanticising the issue is not productive. The idea of the 'noble savage' with its charismatic, deep ecology connotations may have currency in Hollywood, but pragmatism is more likely to drive increased application of IK by Asian policy-makers trying to balance development with sustainability. Indeed, IK is created through pragmatism: the necessity of finding the most efficacious, sustainable livelihoods; if ethnic peoples were conferred with intrinsic IK wisdom, then such knowledge would not be lost so readily.

In terms of rural development and poverty alleviation, the genie is well and truly out of the bottle, and it is naïve to think land use will revert to traditional methods. Now the issue is whether IK will be lost permanently, or whether it can be successfully adapted to the changing environment. Many people in the Himalaya still rely heavily upon IK (managing land and forests, collecting and preparing traditional medicines, protecting water resources, and maintaining headwater forests), but realistically many of the younger generation from minority communities are migrating to the cities permanently, so IK is lost while remittances become key income sources for mountain communities. Now it is city researchers who seek to preserve IK, and

Xu Jianchu and Dipti Thapa

Documenting indigenous knowledge and practices is one way to prevent their complete loss.

perhaps – if given inclusive policy processes – to use it to improve development and conservation management.

Conclusion

The relationship between humans and nature has been forged within religious, moral, cultural, political, economic, and ecological boundaries. Respect for these boundaries by different communities is derived from historically accepted rules and norms. Traditional cultures and indigenous management strategies in the Himalayan region successfully maintained biological diversity and ecosystem's goods and services over a long time: in some cases, traditional knowledge of resource use is linked with craft production, bio-prospecting, and the development of tourism products. In the transition to a market economy, culture and indigenous practices become 'exotic', 'profitable' or 'social capital' instead of 'backward' – these valuations of cultural resources have been defined by outsiders, both powerful state authorities, entrepreneurs, and development agencies.

Many of these problems are of concern throughout the region; rangeland management to combat desertification is a priority throughout central Asia and the northern Himalayan region, while watershed management is becoming critical in the southern and eastern Himalaya. There is growing awareness that management policies and research must be more inclusive of local beliefs and institutions, using both customary authority and elected village committees to help implement policy. This change in attitude is a pragmatic attempt to realise achievable environmental outcomes by using the long experience of people whose cultures have developed in these ecosystems. The challenge of environmental and cultural management is not unique to China and India, but given their diversity, impact on the region, and amazingly rapid growth, this is certainly an area that requires urgent investigation and action.

Following decades of official discouragement, the Himalayan indigenous peoples are once again able to follow their particular cultural beliefs, knowledge, and practices. They are combining their social and natural capital in fresh ways to respond to environmental changes driven by global warming, state policies, and globalisation. It is important to realise that local knowledge is not static, pristine, and culturally specific; it is dynamic and continuously evolving in local and global circumstances, helping build harmony and prosperity in Asia.

Traditional agroforestry and a safer mountain habitat

Rita Sharma, ICIMOD, rsharma@icimod.org

Narendra Bajracharya

A flowering large cardamom bush

As clearly brought out by the Millennium Ecosystem Assessment process, natural ecosystems provide different services to people; e.g., nutrient cycling, soil formation, and primary production. These supporting services also contribute to either provisioning services such as food, water, fibre and fuel; regulating services such as climate, floods, disease control and water purification; and/or cultural services that have aesthetic, spiritual, educational, and recreational values. These ecosystem services can be either direct or indirect depending on the consumptive or non-consumptive use of resources.

The service includes four categories of value: direct use, indirect use, option value, and non-use value. Direct use is consumptive use by local communities and visitors. An example of indirect use value is downstream water use, while optional value has potential value like medicinal and aromatic plants being used for pharmaceuticals or local gene pools being used for human benefit. Non-use value is the greenery that has aesthetic, spiritual/religious, and recreational values.

Traditional agroforestry systems in the mountains are very close to natural ecosystems and they provide similar ecosystem services. These systems with a combination of forestry and agricultural components are excellent practices through which environmental services are obtained in a sustained manner for both upland communities and downstream users. Natural nutrient cycling and maintenance of soil fertility, seral growth of forestry component and related carbon sequestration, improved water quality for

downstream users, and biodiversity conservation are examples of the regulating functions of traditional agroforestry systems.

Agroforestry systems are accepted as one of the good practices of provisioning functions adopted by mountain communities in the Hindu Kush-Himalayan (HKH) region by means of which soils are conserved by improving fertility levels; erosion controlled by forestry; and good quality water provided for local consumption, fodder for livestock, fuel and wood for use as energy and construction materials, and traditional crops for food security. Integration of cash crops in the practice gives good economic returns that help to alleviate poverty. These attributes have an impact in terms of improving human health. One good example of such a traditional agroforestry practice is the cultivation of large cardamoms as a cash crop in the eastern Himalayas. This type of agroforestry is a unique example of providing ecological sustenance and economic viability for mountain people while providing goods and services to downstream users.

The large cardamom *(Amomum subulatum)* is a perennial cash crop grown beneath the forest cover on marginal lands. Large cardamom agroforestry has been a boon to the peoples of Sikkim for a very long time. It is widely cultivated under the nitrogen-fixing Himalayan alder *(Alnus nepalensis)*, a practice modified by people to maintain soil fertility and increase productivity. Its cultivation is an example of how a local mountain niche can be exploited in a sustainable way. The capsules (fruit) produced are used widely as a spice/condiment and contain about 3% of essential oil rich in cineole. In the past three decades, this traditional agroforestry system has become so popular that the practice was scaled up through community exchange in the neighbouring countries of Nepal and Bhutan. In Sikkim alone, the area under large cardamoms increased by 135% between 1975 and 1995. However, recently observed degeneration of cardamom in Sikkim reduced the yield considerably, drawing attention to the need for rejuvenation programmes.

Ecological Sustenance: The cultivation of perennial large cardamom is a good example of fulfilling mountain specificities and needs. This crop is a low-volume, high-value crop, needs less labour than other crops, is non-perishable, and is less exhaustive in terms of use of soil nutrients. It meets the adaptive requirements of mountain specificities such as inaccessibility by producing marketable products that are non-perishable; marginality by growing it on marginal lands belonging to the poor and indigenous peoples; fragility by providing forest cover and a perennial agricultural cash crop; and opportunities for increased income because it is a niche cash crop. This agroforestry practice is a closed system that does not depend on external inputs. The firewood produced is sufficient for both domestic consumption and for curing cardamom capsules. Comparison of the large cardamom in Sikkim shows that soil loss, overland flow, and nutrient loss are low compared to other cropping

Large cardamom agroforestry is an example of mountain landscape management in which both ecological and economic aspirations of local, regional, and international communities are served.

Rita Sharma

The traditional drying kiln for curing large cardamom after harvest is an efficient system. Note the firewood for cardamom drying comes from the shade trees of the plantation itself.

systems. Cardamom agroforestry systems under the Himalayan alder are more productive as they have faster rates of nutrient cycling than others. The poor nutrient conservation and low nutrient use efficiency of this species and malleability of nutrient cycling under its influence make it an excellent associate for cardamom by promoting availability and rapid cycling of nutrients. Biodiversity is another indicator for sustainability, and biologically diversified systems have a capacity for resilience and more sustenance than other systems. Agroforestry practice supports diverse tree species, and the tree diversity index in cardamom agroforestry is higher than in other agroforestry practices in the region. The trees also support birds and other wildlife, and this influences the ecological structure and functioning of the agroforestry system.

Economic Benefits: The economic benefits derived from large cardamom agroforestry in Sikkim show that the gross income from large cardamom cultivation increased from 1.9 million in 1975-76 to 5.7 million in 1985-86, and to 6.4 million US $ in 1995-96. Percentage gross income from different cash crops over totals of all cash crops in a ten-year period shows that in 1975-76 large cardamom contributed more than 80%, decreasing to about 58% in 1985-86 and to about 38% in 1995-96. However, the net income from the large cardamom is still higher than from other cash crops throughout the period. Two systems, namely, (a) large cardamom dominated and (b) maize-potato dominated were studied in Sikkim. Gross incomes from different livelihood options from these systems were compared and results showed that the household income and per person per day income were almost double for large cardamom than maize-potato dominated systems. The income from large cardamoms has been substantially higher than for other livelihood options from both systems.

The large cardamom agroforestry practice described is a perfect example of mountain landscape management in which both the ecological and economic aspirations of local, regional, and international communities are achieved. The local community's needs for provision by direct benefit are already available through agroforestry. The upstream management benefits for hydroelectric projects and recreation for visitors and downstream users are potential contributors to the sustenance of such systems in the mountains through payment. However, the services provided in terms of regulating values, such as for climate, flood, disease, and water purification, do not generate remuneration for mountain communities in the HKH region. The challenge now lies with policy makers, researchers, and beneficiaries to develop mechanisms for delivering such remuneration to mountain communities in the region to facilitate both economic and environmental sustainability.

Xu Jianchu

Tea plantation under trees in West Bengal, India, another example of agroforestry management

Payment for environmental services in China

A policy perspective

He Jun, World Agroforestry Centre (ICRAF, China), H.Jun@cgiar.org

Xu Jianchu

Tibetan pastoralists in Baima Snow Mountain Nature Reserve in northwest Yunnan

Today, global recognition of an economic approach to environmental management is increasing in all sectors of the economy. Since the forests are valuable natural resources, providing ecosystem services such as attractive landscapes, carbon sequestration, biodiversity conservation, and watershed protection, considerable attention is being given to forest management issues. Environmental goods and services benefit both local and global communities; but not all environmental uses generate financial returns commensurate with their real economic value. This is because several forest benefits, notably environmental services, are not traded in the market and have no observable price, for which there are several reasons.

One of the most important reasons is that many environmental services fall into the category of positive externalities or public goods because of their non-excludability and non-rivalry. On the other hand, global society recognises that upland forest dwellers are among the very groups who provide such services by maintaining the forests, whereas they are living in poverty. This is because different stakeholders are involved in environmental services and they benefit differently from them.

China is a mountainous country with poor forest resources. Hence the forest ecosystem at the headwaters of rivers plays a key role in environmental services for local people and those downstream. For half a century, a policy of forest exploitation in China led to disastrous consequences: degradation of forests and landscapes, loss of biodiversity, unacceptable levels of soil erosion, and catastrophic flooding. Given this dilemma in forest management, it is clear that how forestry policy and forest

governance structure address the issues of payment for environmental services and poverty alleviation is a crucial issue in developing countries. In the mountainous regions of China, especially, where there are biodiversity hotspots and an enormous population living in poverty, it is a just concern not only for researchers and development practitioners, but also for government officials and central policy-makers. In this respect, people are not only seeking possibilities for market mechanism development, but are also focused on how current policy can be adjusted to arrive at a win-win situation of reducing poverty while improving forest conservation.

Xu Jianchu

Forest harvesting quotas have failed to stop illegal logging in China's forests.

In China, socioeconomic changes have been occurring rapidly, significantly in the transition from a centrally planned to a market-based economic system. The forest sector in China lags behind other sectors in this transition process. The government has launched a limited programme of decentralised reform, as it is concerned about negative environmental externalities caused by losing control of forest resources. The government held strict control even over collectively-owned resources through mandatory policies such as log harvesting quotas, logging bans, conversion of sloping farmland to forest, and establishment of nature reserves.

Collective forests are a crucial component in farmers' livelihood development and environmental protection in China. In 1982, reform in forestland tenure was undertaken to create more incentives for forest owners to manage their land. In 1985, a centralised harvest quota system was established to control widespread illegal logging. In 1996, two types of forest classification were identified to serve different objectives: (1) commercial forests and (2) public beneficiary forests, and these became the working basis of the Forest Ecological Compensation Programme. In 1998, the logging ban component of the Natural Forest Protection Programme was launched, characterised by a sizeable investment from the Central Government to strengthen the forest guard system.

Owners of collective forests were stimulated when economic opportunities from forest resources arose as a result of market development. Some laws and regulations (e.g., Organic Law of the Village Committee) were favourable to collective forest owners. Challenges to the legitimacy of mandatory policies made by the government forest administration emerged. In 1998, following the Yangtze River flood, the failure of the log harvesting quotas and other forest policies instigated a policy shift from using mandatory instruments to applying more inductive instruments. That is, the government gave forest owners incentives to protect forest resources by providing subsidies, rewards, and taxation breaks, rather than forcing forest owners into compliance with the threat of penalties, taxation, and quotas. The Sloping Land Conversion Programme is an example of this policy shift that subsidises farmers by providing grain, cash, and saplings to encourage owners to convert sloping land into forestland or grassland to reduce soil erosion. However, the funding

source for forest conservation is not so stable. It is unlikely that this programme will be sustainable once funding is finished. In 2001, the Forest Ecological Compensation Programme (FECP) was introduced in 11 provinces as an innovative pilot programme meant to be a conservation mechanism employing economic incentives. The FECP was implemented by the Forest Law of 1998 as there was growing recognition of the limitations of strict mandatory forest protection approaches. It was expected that a payment scheme would achieve protection objectives, as it is more transparent, voluntary, and just. After the three-year pilot phase finished at the end of 2004, the FECP was formally implemented in 11 provinces for scaling-up.

Most payment schemes for environmental services in China have been publicly financed, including two forest conservation programmes introduced by the central government.

Clearly, most payment schemes for environmental services in China have been publicly financed, including the two forest conservation programmes introduced on a large scale by the central government. Current observations on the implementation of the payment schemes prompt us to understand the significance of policy perspectives on forest governance in this regard, rather than jumping into developing market mechanisms. From a policy perspective there are several critical issues that should be addressed.

Security of forest property rights: Security of forest property rights is essential in order to give poor households control over, and right to benefit from, current Chinese policies and the environmental service they provide in the long run.

Social space for multi-stakeholders to negotiate and participate: A social space is important in order to facilitate negotiation, bargaining, and participation about improving recent payment schemes. However, at present, the limited participation by both local governments and residents in the design of payment schemes has impaired their willingness to pay; and, on the other hand, monitoring and evaluation by the tertiary sector is lacking in current policy implementation.

Xu Jianchu

Woman milking a yak, a source of food and livelihood in the mountain regions of China and the Himalaya

Good governance and a cooperative institution: For sustainable management of natural resources to guarantee environmental services can be provided and improved continuously and improvement of policy design and implementation to ensure environmental payment can be made constantly and fairly, a cooperative institution is needed to manage both sectors. This institution should be established through participation with multi-stakeholders. The institution should be transparent, accountable, responsive, equitable, and efficient in policy design and implementation.

Struggling for basic rights

Environmental justice in the Himalayas

Radhika Gupta, ICIMOD, rgupta@icimod.org

Xu Jianchu

Monoculture plantations, such as this tea plantation in West Bengal Northeast India, often displace landless herders

More and more services provided by the Himalayan ecosystem are becoming valued economically as the demand for basic resources spirals, driven by high rates of economic growth and the concomitant development of new infrastructure. As many Himalayan rivers are harnessed for hydropower generation and forest areas converted to mono-plantations for commercial purposes, the notion of payment for environmental services to upstream providers by downstream beneficiaries has acquired widespread legitimacy.

However, even as negotiations for compensation and payment to the stewards of these resources take place at macro-levels, the livelihoods of those directly dependent on these resources continue to be threatened. This is largely because issues related to the basic dignity of survival are yet to be adequately addressed. Many communities that have been marginalised historically from mainstream processes of development and decision-making continue to struggle for basic rights to land and livelihoods.

Minority and indigenous communities in many parts of the Himalayas are losing access to common property resources at an accelerated pace. The rights of these communities are very often defined by customary laws and norms. The loss of collective property rights to land, forests, water bodies, and pastures is often intrinsically linked to basic rights to food, potable water, material, and survival. The last two decades have seen a significant impetus on decentralisation in policies related to conservation and natural

resource management. However, the inherent contradiction between larger development plans, which eventually invoke principles of 'eminent domain' of the state in relation to land, and the historical rights of local communities to basic tenurial security remains unresolved.

The framework of 'environmental justice' makes a direct link between environmental rights and basic civil and political rights. The concept was born from a specific incident of protest by coloured communities in the U.S. in the 1980s against dumping of toxic wastes in or near their neighbourhoods. The struggle for environmental justice seeks to redress the disproportionate burden of environmental damage borne by marginalised communities. In the context of South Asia, and in that of the Himalayas in particular, the framework of environmental justice must expand its boundaries to include issues of access to natural resources; access which is very often denied by projects and enterprises that not only have negative ecological impacts but also directly affect basic livelihoods. Environmental justice in South Asia is underpinned fundamentally on the understanding that productive and sustainable rights to one's environment are intrinsically linked to the realisation of basic civil and political rights.

Almost all the major issues of environmental justice that exist in the Himalayan region today can be subsumed by the overarching issue of land rights and tenurial security. Tackling issues of environmental injustice calls for a multi-pronged approach which simultaneously challenges the status of transparency and accountability in governance and people's participation in decision-making processes, requiring eventually a renegotiation of the equation between the state, local communities, and private corporations.

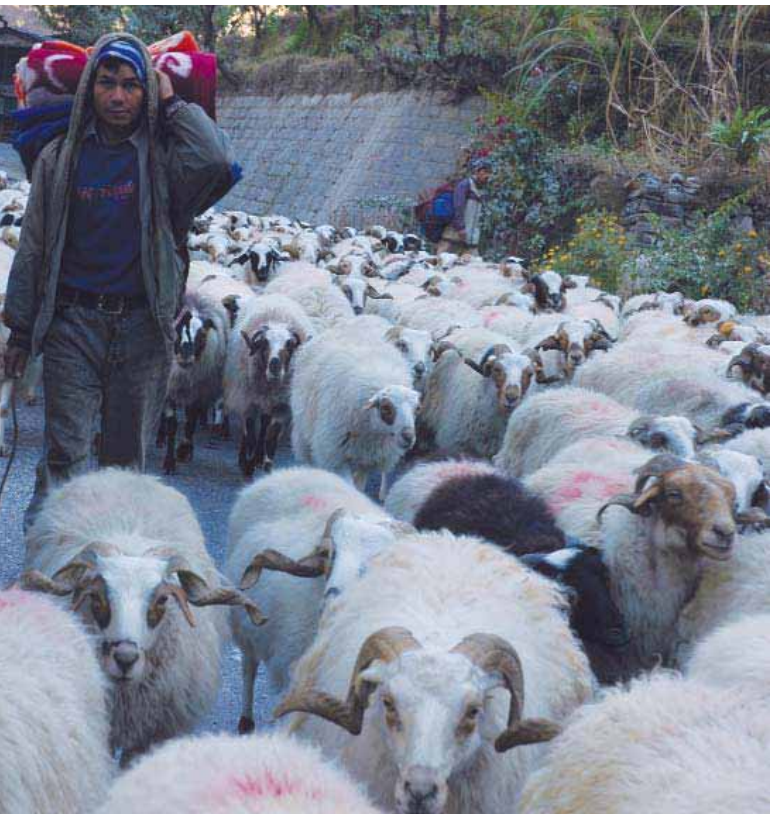
ICIMOD is currently engaged in a programme to 'Advance Minority Rights to Environmental Justice' with the support of the Ford Foundation. This programme combines action research to highlight issues of environmental injustice and capacity building to create awareness as well as means of accessing justice.

Some of the major issues in environmental justice emerging in the Himalayas include the following.

- Harnessing Himalayan rivers for hydroelectricity and big dam projects – issues include lack of free, prior, and informed consent; inadequate implementation of environmental impact assessment recommendations; and displacement and absence of satisfactory resettlement and rehabilitation
- Mining for infrastructure development – including the destruction of local habitats leading to pollution and contamination of water bodies with negative impacts on community health
- Conflicts and contradictions between conservation policies and usufruct rights of communities, both settled and nomadic
- Discouragement of traditional farming practices such as jhum, which makes local subsistence livelihoods more fragile and market dependent and leads to a loss of biodiversity, robust agro-forestry practices, and food security

Xu Jianchu

The Kunming-Bangkok highway construction: infrastructure sometimes leads to felling of trees and destruction of local habitat



Narendra Bajracharya

Privatisation of rangelands leave landless herders no place to graze their animals

There is no easy route to environmental justice for communities which are historically marginalised and whose interests are often pitted against the dominant 'power elite'. First and foremost, good, fact-based scientific research is needed to document cases of injustice as well as provide a basis for advocacy. It is important that communities make informed choices about the strategies of advocacy that they want to adopt. This in turn entails the need to be in possession of information on wider policies, laws, rules, and regulations; as also on more detailed location-specific and project-specific information.

Today new legislation and tools that empower communities to make these informed choices are becoming increasingly available. Taking an example from India, the 'Right to Information Act' passed in 2005 empowers every citizen to have access to information from all government departments and agencies about policies and decisions that affect them. The implementation of this Act has far-reaching implications for empowering communities to demand accountability and transparency in governance. Governments and civil society groups in other countries of the region may learn lessons from this legislation about how to improve their governance system.

The use of public interest litigation (PIL) has also become increasingly popular as a means of accessing environmental justice. Where judicial systems continue to be weak and subservient to larger political interests, public interest litigation remains a tool that can be used to bypass arduous and tedious procedural legal processes. PIL allows parties and individuals not necessarily directly affected by the issue at hand to file a petition as long as the matter is in the public interest.

Even where cases may not be won, attention is brought to the issue within civil society as a whole. Environmental justice as sought through the judicial system has expanded the idea of the 'fundamental right to life', as constitutionally granted, to include the right to a safe and healthy environment.

Finally, the role played by the media is imperative in creating awareness. Any advocacy on issues of environmental justice should ensure that the media is informed and engaged continuously and consistently. Results from research exploring and highlighting alternative options need to be communicated to the media for dissemination so that such research does not only preach to the converted.

Issues of environmental justice have to be taken seriously in the Himalayan region to mitigate the manifestation of accumulated discontent arising from the sense of injustice in the form of conflicts. Increasingly, recognition of the right to occupy, govern, and participate in decisions relating to the natural resource base are linked to issues of identity – both political and cultural. These are all related to basic security of lives and livelihoods gained from access to land and secure tenure. Unless this is acknowledged and addressed, environmental injustices will continue, combining both ecological destruction and human misery.

中国科学院 水利部 成都山地灾害与环境研究所
Institute of Mountain Hazards and Environment

The Institute of Mountain Hazards and Environment (IMHE), Chinese Academy of Sciences and Ministry of Water Conservancy, was founded in Chengdu, Southwest China in 1966. The IMHE conducts multidisciplinary research on mountain hazards, environmental management, and sustainable development in the mountain region of China. The Institute has 180 research professionals and a support staff of 20 administrative staff.

The key research areas include: a) mountain hazard management (e.g. debris flows, landslides, and soil erosion); b) environmental assessment, planning, and sustainable regional development; c) environmental degradation and ecological restoration; d) remote sensing and GIS; and e) soil ecology and fertility management. IMHE has nine research divisions and six field stations: a) Dongchuan Debris Flow observation in Yunnan Province; b) Gongga Mountain Ecosystem Monitoring; c) Yanting Agroecosystem Experimental Station; d) Jinlongshan Landslide Observation Station; e) Jiuzhaigou Natural Landscape Ecology Research Station; f) Yuanmou Dry-hot Valley Soil and Water Conservation and Ecological Restoration Station.

In the past four decades, the government has funded hundreds of research projects in mountain disaster management, environmental and ecological assessment, land use and regional development planning, and developing mountain technology for poverty alleviation and environmental protection. The IMHE provides key technical support for the National Disaster Reduction Centre of China and for developing a national disaster management strategy and a National Action Plan for Disaster Reduction for the People's Republic of China (2006-2015). The IMHE has postgraduate programmes (PhD and Masters degrees) in environment management and disaster reduction. It has established international collaboration with universities and research and development organisations worldwide and in the Himalayan region. Recently, the IMHE was designated by the Chinese Academy of Sciences to host a national secretariat for facilitating regional collaboration with ICIMOD and neighbouring countries in the Himalayan region.

News from partners

Fourth International Conference on Debris-Flow Hazard Mitigation

10-13 September 2007, Chengdu, China
Call for papers and presentations

The Fourth International Conference on Debris-Flow Hazard Mitigation (DFHM) will be held in Chengdu from 10-13 September 2007, and will be hosted by the Institute of Mountain Hazards and Environment, Chinese Academy of Sciences. The conference will provide a forum for debris-flow scientists to exchange ideas about how to cope with debris-flow hazards using the most advanced, state-of-the-art methodologies in mechanics as well as in hazard prediction and risk assessment. The major themes for the conference are exchange of knowledge among researchers and practising engineers and technology transfer between the two sub-fields of debris-flow mechanics and debris-flow hazard prediction and assessment. The conference includes oral and poster presentations and panel discussions. English is the official language of the conference.

For more information, see the conference website:
http://4thdfhm.imde.ac.cn
or contact Dr. Peng Cui by email: pengcui@imde.ac.cn

Centre News

Ongoing programme review

'Stocktaking and future paths'
Partners reflect on ICIMOD programmes

ICIMOD file photo

Partners review meetings 2006
Chengdu, China in April

Islamabad, Pakistan in March

ICIMOD is currently reviewing and evaluating its programmes of the last few years under the Medium Term Action Plan (MTAP). Yearly reviews take place as a part of the annual planning process, but the comprehensive review is done only every five years as part of the Quinquennial Review (QQR) – an external review commissioned by the ICIMOD Board. The present QQR, the 4th since ICIMOD's founding, assesses what has been achieved in the first three years of the MTAP period (2003-2007), reviews current programme activities, and helps identify strategies and options for the future. As a contribution to the QQR process, a detailed partnership review was carried out comprising a series of one-day partners' review meetings in each country, complemented by questionnaires sent to 185 partners, of which 30% responded. In all, 224 partners took part in the review process. Most of those who participated are partners of long standing (more than five years) and had been involved in at least two collaborative projects with ICIMOD.

The assessments began in March 2006 in Afghanistan, and continued to May in Nepal and Myanmar. Partners representing state, province, and national governments as well as the development

Kamal Banskota

The Bangladesh country review in Dhaka, April 2006

community were brought together to collectively assess ICIMOD's programmes, strengths, weaknesses, and opportunities, and areas in which there is scope to improve or scale up our work.

How the partners viewed us

Overall, the partners recognised ICIMOD's value and contribution to diverse mountain issues and sustainable mountain development. The Centre's role as a regional centre for knowledge and information sharing and capacity building, its knowledge bases, and its wide-ranging regional reach through partnerships established over the years were acknowledged. In the survey, partners identified information, communication, and extension products and materials; capacity building and training of trainers; and participation in regional networks as the areas of ICIMOD's work benefiting them the most. The Centre was recognised as providing an interactive regional platform for learing, and for exchanging data, information, and knowledge among country partners, especially in natural hazards mitigation and GIS/RS technologies, as well as a platform for taking regional mountain issues to the global forums.

Most partners reported integrating the concepts and technologies they learned in collaborative activities supported by ICIMOD in their projects and specific country and mountain contexts. The Centre's potential to facilitate real-time or near real-time data exchange with its improved geographic and information system and remote sensing facilities was recognised as an area it can continue to expand on in the future. The partners also acknowledged the usefulness of innovative technologies for mountain agriculture and livelihoods

RMC Partners' Review Meetings

Afghanistan:	28 March 2006, Ministry of Agriculture, Livestock and Food, Kabul
Bangladesh:	12 April 2006, Bangladesh Forest Research Institute, Chittagong
Bhutan:	29 March 2006, Hotel Riverview, Thimphu
China:	16 April 2006, Sunjoy Inn, Chengdu
India:	5 April 2006, Ministry of Environment and Forests, New Delhi
Myanmar:	25 May 2006, Department of Forest, Yangon
Nepal:	8 May 2006, ICIMOD, Khumaltar
Pakistan:	16 March 2006, Margalla Motels, Islamabad

ICIMOD Board of Governors

Regional Board Members

Mr. Muhammad Ismail Qureshi
CHAIRPERSON
Secretary
Ministry of Food, Agriculture and Livestock, Pakistan

Eng. Ghulam Mostafa Jawad
Deputy Minister of Agriculture
Ministry of Agriculture and Livestock
Afghanistan

Mr. Khan M. Ibrahim Hossain
Secretary
Ministry of Chittagong Hill Tracts' Affairs, Bangladesh

Dasho Sangay Thinley
Secretary
Ministry of Agriculture, Bhutan

Prof. Li Jiayang
Vice President
The Chinese Academy of Sciences, China

Dr. Prodipto Ghosh
Secretary
Ministry of Environment and Forests, India

U Soe Win Hlaing
Director General
Forest Department
Myanmar

Awaiting Nomination
Nepal

Independent Board Members

Dr. Tone Bleie
Chief, Gender and Development
UN ESCAP
Thailand

Prof. Bruno Messerli
Professor
Institute of Geography
University of Berne
Switzerland

Prof. Zhao Shidong
Research Professor of Forest Ecology
Chinese Academy of Sciences
China

Prof. Jamuna Sharan Singh
Emeritus Professor
Department of Botany,
Banaras Hindu University
India

Dr. Rob Visser
Ministry of Foreign Affairs (DSI)
The Netherlands

Dr. Anne Whyte
VICE CHAIR BOARD
Programme Advisory Committee Chair and Member ICIMOD Foundation
Mestor Associates
Canada

Dr. J. Gabriel Campbell
(Ex-officio) Director General, ICIMOD

propagated through its watershed, rangeland, diversified income-related and other activities, although there were areas requiring attention.

Assessments in each country

In Pakistan, the partners acknowledged ICIMOD's contribution to Pakistan's post earthquake rehabilitation efforts, and highlighted disaster preparedness in mountains as an area the Centre can pursue more vigorously, in recognition of the greater physical vulnerability of mountains.

In Nepal, partners acknowledged the Centre's 'think-tank' role on mountain issues, as well as the expertise of its multidisciplinary team of professionals from the region and the world, but they suggested having more focus and greater reach, especially through publications.

In India, partners recognised ICIMOD as "an interactive regional resource centre for integrating and exchanging data and information among country partners." Our Indian partners indicated further opportunities for ICIMOD to lead the way in watershed management, eco-system services, energy planning, marketing of value-added products including medicinal plants, and eco-tourism, among others.

In Bangladesh, the Centre was recognised as a 'knowledge bank' on mountain development themes and its institutional competence.

In Bhutan, ICIMOD's small, compact, transparent, and flexible multi-cultural organisation and its non-political character were recognised as the organisation's strengths, but suggested that ICIMOD could link its programme more strongly with government programmes.

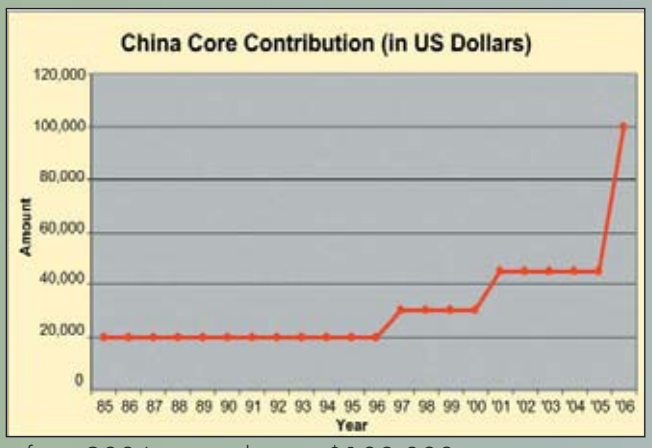
In Afghanistan and Myanmar, where ICIMOD has conducted a few training events and capacity building activities, the assessment explored possible areas of future cooperation.

Recommendations for the future

ICIMOD can work at better aligning its programmes and interventions for greater impacts with national programmes and policies in all the member countries. It should strive to achieve 'programmatic balance' among member countries, as well as among remote mountain areas within countries. Our partners in China have suggested that ICIMOD track and understand policy, and align activities with China's development priorities. They also decided to establish a coordination committee to support ICIMOD's work in China.

China Increases Annual Core Contribution

China has become the first regional member country to make an annual contribution of $100,000 to ICIMOD – more than double the amount of its earlier annual contribution and the highest contribution from a regional member country. This significant increase was endorsed in principle for all regional member countries by the Board of Governors based on recommendations made by the Financial Strategy Working Group which met in September 2005.



China has been contributing to the core fund of ICIMOD since1985: the initial annual contribution was $20,000; this was raised to $30,000 in 1997, to $45,000 in 2001, and now, from 2006 onwards to a $100,000.

China was also the first member country to contribute $100,000 towards building ICIMOD's new Headquarters in 2004. India and Pakistan also contributed $100,000 each, Bangladesh gave $28,000, and Bhutan provided a pavilion. Nepal made it all possible by providing 1.5 ha of land worth over US $1 million.

The Centre expresses its sincere thanks to China for its continuous support to ICIMOD.

Milan Raj Tuladhar <mtuladhar@icimod.org>

Other areas in which the partners made concrete recommendations include stronger policy presence and interventions including flagship roles in technologies demonstration, policy advocacy, and long-term regional cooperation, and possibly the establishment of country offices in some of the member countries; improved access to country information and databases; and joint planning and monitoring together with partners. Some partners suggested that ICIMOD programmes be more needs-based in specific countries. The partners recognised the limitations of funding and decreasing donor priority in the region as limiting ICIMOD's capacity to broaden the scope of its work, however.

The partners saw opportunities for future collaborative work in the areas of income diversification and natural resources management, and in GIS and RS for disaster preparedness.

The country review meetings were chaired in each country by the regional board members and/or their deputies. During the meetings, ICIMOD management teams made presentations on the status of implementation of the MTAP in each country; a summary assessment of work with ICIMOD by the lead partners in each RMC; and strengths, weaknesses, opportunities, and threats analysis by the partners (analyses focused on themes of regional collaboration, participatory action research, capacity building, and, in some cases, national coordination of ICIMOD/RMC collaborative programmes). Where possible, the meetings coincided with related events taking place in the country to ensure broader interaction among diverse partners.

ICIMOD recognises the valuable recommendations from the review meetings, which will help the Centre in its programme planning. Building on its outputs and outcomes, ICIMOD is committed to increasing the value and effectiveness of its programmes by continuing to work through and together with our country partners. The review meetings were used as a platform for the country partner consultations subsequently undertaken by the QQR team comprising Dr. R.S. Tolia, Chief Information Commissioner of the State of Uttaranchal, India; Dr. Zhang Linxiu of the Center for Chinese Agricultural Policy, Chinese Academy of Sciences, Beijing, People's Republic of China; Dr. Andreas Schild, team leader and oversight consultant of the National Solidarity Program in Afghanistan; and Dr. Gunter Schmidt, Managing Director (CFO), Finance and Administration, Business Process Management GFA Consulting Group GmbH, Hamburg, Germany. The results of the partner review and the QQR will provide inputs to ICIMOD's next Five-Year Medium Term Action Plan.

Prem Manandhar <pmanandhar@icimod.org>, Farid Ahmad <faahmad@icimod.org> and Joyce M. Mendez <jmendez@icimod.org> based on country assessment reports prepared by the PPD

Khan M. Ibrahim Hossain, new board member from Bangladesh

Mr. Khan M. Ibrahim Hossain, Secretary of the Ministry of Chittagong Hill Tracts Affairs (MCHTA), was nominated by the Government of Bangladesh to be the ICIMOD Board Member in January 2006.

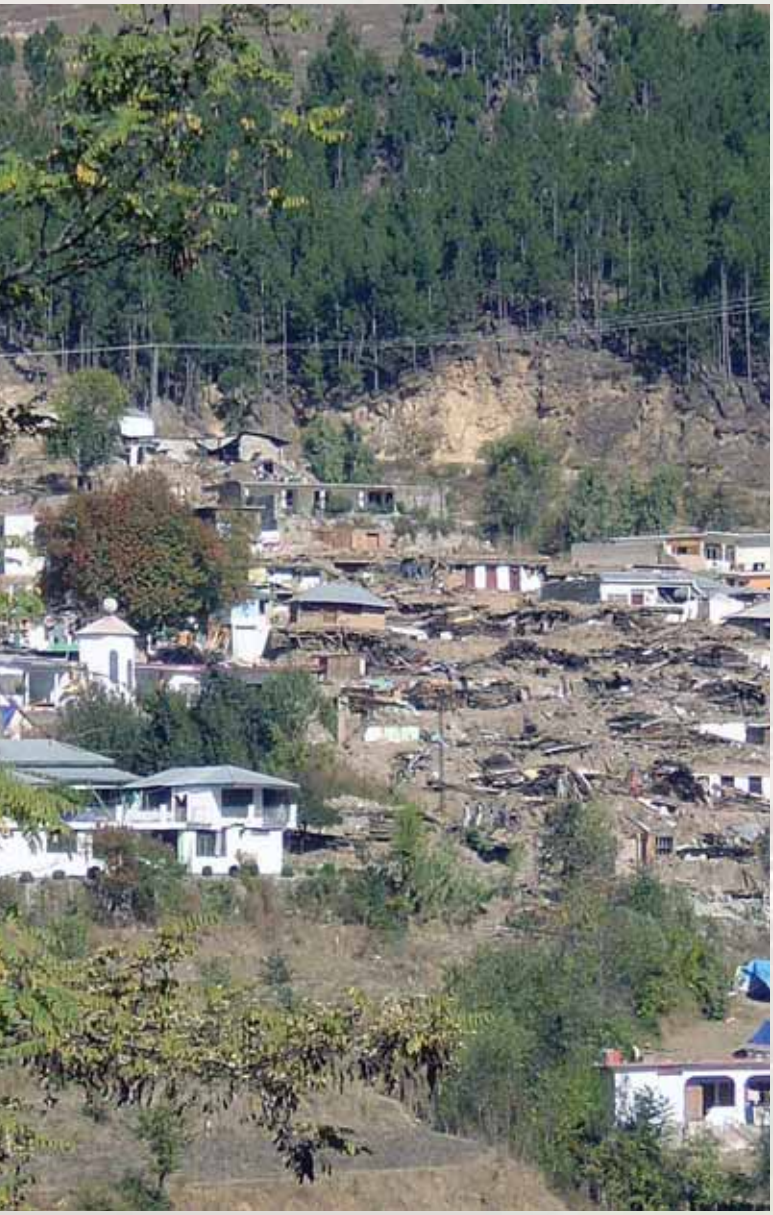
Mr. Khan joined the civil service in Bangladesh in 1979, serving in various capacities both in the Police Administration and several government ministries, where he had been deputy secretary, joint secretary, and additional secretary. At present he works with the Bangladesh Civil Service . Before joining as Secretary in MCHTA, Mr. Khan served as Director General of the Department of Environment under the Ministry of Environment and Forest. Mr. Khan also enjoyed a fruitful academic career prior to his joining the civil service. He has received scholarships for higher studies and in-service training both at home and abroad, and has served in Yugoslavia for a UN assignment. He was also a lecturer in several government colleges in Bangladesh.

Mr. Khan graduated from Dhaka University and did his Masters in English Literature from the Karachi University, Pakistan. He has travelled extensively and is a member of several professional organisations.

Update

ICIMOD's contribution to rehabilitatiing livelihoods in Pakistan's earthquake-affected areas

In December 2005, an ICIMOD team visited the areas devastated by the 2005 earthquake in Pakistan. The team helped the Government of Pakistan's Ministry of Food, Agriculture, and Livestock (MinFAL) draw up a proposal to help rebuild people's lives in the earthquake-affected areas based ICIMOD's work in beekeeping, rangelands, renewable energy, watershed management, land rehabilitation, and management of common property resources in Pakistan. The proposal's planned activities have been discussed at length with potential donors and with Pakistan's Earthquake Rebuilding and Rehabilitation Authority (ERRA). To fit in with plans and projects agreed to by both multilateral and bilateral agencies, the implementation aspects of ICIMOD's proposal have been scaled down, while components that build capacity on sustainable mountain development, aspects of institutional development for community-based organisations, cooperatives and groups, women's participation, and training partners have been strengthened. The approach will continue to be through four training and demonstration sites: two in the North West Frontier Province and two in Kashmir. This is a niche in which ICIMOD has comparative advantage and an area that has been somewhat neglected by implementing agencies such as NGOs and bilaterally-funded projects.



J Gabriel Campbell

Malkan village near Mansehra district, NWF Province after the earthquake

The proposal provides an opportunity to scale up nine years and more of action research carried out by ICIMOD under the PARDYP Project in the Hilkot Watershed, an area that was also affected by the earthquake. Many of the interventions proposed have already been tested there and include ways and means of increasing farm incomes, reducing pressure on natural resources, and making more efficient use of water. Some donors have expressed interest in funding an initial six-month to one-year phase of various aspects of the proposal. It has been favourably received by the Earthquake Rehabilitation Authority and administrative arrangements for opening an ICIMOD office in Pakistan are in an advance stage.

The earthquake portal containing geospatial information/knowledge resources on Pakistan is also on the ICIMOD homepage at http://www.icimodgis.net/Pak%20 earthquake/index.htm.

Roger White <rwhite@icimod.org>

Times of Change in Nepal

*by **Srabani Roy**, Programme and Project Development Specialist **

The author beside Dipti Thapa at the Kalanki (Loktantra) Chowk mass gathering

Srabani Roy

Crowd gathered in Kalanki (Loktantra) Chowk

Nepal captured the world's attention for three weeks this Spring as a massive, extraordinary people's movement, aptly dubbed as the 'Rhododendron Revolution', ousted four years of His Majesty, King Gyanendra's rule and restored democracy in the country.

Hundreds of thousands of supporters of the seven-party political alliance (SPA), from all walks of life, defied curfew imposed by the government and marched on the Ring Road surrounding the city in protest. On April 21, the country saw the strongest government backlash against the movement, when at least three protesters were killed by the state's security forces at Kalanki Chowk, (now renamed 'Loktantra Chowk' or 'Martyrs' Square').

But neither bullets nor tear gas could silence the voice of the people. Protests continued throughout the period of curfews (extending to three uncertain, protracted weeks) as people demanded that the King step down, a constituent assembly be formed that would turn Nepal into a republic, and more than anything, that peace be restored in this beautiful country.

Having made a proclamation three days before in response to the protests – which failed to appease the political parties and the people – King Gyanendra finally gave in to increasing pressure from the street movement. Nearing midnight on April 24, 2006 the King made a second and final declaration, proclaiming before the people of Nepal and the world that he would reinstate the dissolved parliament elected under the 1990 Constitution, and that it would be responsible for running the country henceforth, following the road map laid out by the SPA. The Parliament has since been restored and, in another historic moment on 19 May 2006, it unanimously voted to strip the King of most of his powers, making him effectively a ceremonial monarch. The government is no longer addressed as, 'His Majesty's Government of Nepal', but simply, the 'Government of Nepal'.

Throughout those uncertain times, staff, family, and friends of ICIMOD came together and supported one another. Thirty-five of ICIMOD's staff are from countries other than Nepal. In accordance with ICIMOD's security policies, the

Centre followed the direction of the United Nations Mission Office in Nepal and enabled expatriate staff and their dependents who felt a need to temporarily leave the country to do so – either to our regional member countries where they had work, or to their home countries. Some staff members actually took this option – moving to Hotel Himalaya in order to take the tourist bus to the airport, (hotel buses were the only vehicles allowed by the government to transport people to flights out of Kathmandu during those times).

But the day the second and final royal proclamation was made, it had become apparent that the country had taken a 180-degree turn and what would have been the largest protests and final showdown, turned instead into massive victory rallies for the movement. There was an immediately palpable change in the air from tension and fear, to relief and hope. Almost all of our expatriate staff decided to return to their homes in Kathmandu.

ICIMOD NRM intern, **Ms. Dipti Thapa,** witnessed many of the protests from her home in Kalanki, including the day the security personnel opened fired on demonstrators.

"Hearing gun shots from my house deterred me from going out. But I tried to find other ways to contribute."

"As a young Nepali, I felt that this was our fight. My parents fought in 1990, and this was our turn."

Thapa eventually found a way to share her eyewitness accounts before the world, posting her daily commentaries of events at the Cornell-Nepal list-serve and the International Nepal Solidarity Network.

"They were not analysis pieces," she said, "and did not take sides", but they provided an account from someone right where the action was taking place, who was Nepali and understood the nuances of the language and culture of the Nepalese, and was not filtering the information influenced by any political agenda or outlook.

"In general, awareness has been raised among young people. There are challenges about the future, but things have never looked as hopeful as they do now," she reflects.

ICIMOD Deputy Director General-Programmes, **Dr. Madhav Karki**, another Nepali national, observed the unfolding upheaval from afar. He was in Kunming, China for the WHEM-EcoHealth inception workshop throughout much of the unrest.

"I was watching the news and monitoring the situation every hour."

Reflecting on partners' and donors' reactions to the unfolding events (those who were attending the workshop), Karki observed: "donors were feeling uneasy with the government and partners in Nepal. I could see an underlying hesitation to commit for the future."

ICIMOD staff express happiness and relief over events in Nepal

April and May 2006 have been tumultuous times in Nepal. Strikes and demonstrations called by the political parties became more vociferous every day. Blockades enforced by the Maoists resulted in shortages in food and basic supplies, and declaration of curfew by the Government made it increasingly difficult to operate. The situation was tense and some families were considering leaving temporarily, while staff members were encouraged to relocate workshops and work programmes in our regional member countries.

Fortunately, all parties involved in the recent conflict found a solution with the restoration of Parliament and the declaration of intention to hold a constituent assembly. Ceasefires have been declared by both sides and a code of conduct agreed upon. The road ahead could be full of obstacles, but we are now hopeful that lasting peace and the basis for security and prosperity can now be found through dialogue.

We were pleased that throughout this period, ICIMOD's security systems of area coordinators, telephone trees, and our arrangements for support made through the United Nations security system and the International SOS company worked exceptionally well and we were able to keep staff informed and deal with problems as they came up. I am grateful to Milan Tuladhar and all our area coordinators, security guards, travel and administrative staff, finance staff, the motorpool, and the programme managers for their good spirits, calm professionalism, and tireless overtime work during the period of crisis."

Dr. J. Gabriel Campbell, *ICIMOD Director General*

Returning to Kathmandu on April 28 after the unrest, Karki expressed "pleasant surprise to see things back to normal so quickly."

For **Dr. Mats Eriksson**, Senior Water Specialist of ICIMOD's Water, Hazards and Environmental Management (WHEM) Programme, the entire "Kathmandu Spring" passed by relatively quietly.

"At least one day of the curfew I biked down to the Ring Road and saw lots of people and there was a wobbly feeling in the air…This was the day of the shootings."

But overall, his days were peaceful, even productive. He did worry though that the "shops were running out of food and [his] diet would have to change." Eriksson, who lives outside of the Ring Road and the curfew zone, was about the only ICIMOD staff member who was able to go to the office during the days of tumult, in fact enjoying "a few quiet working days" alone.

Karki cannot help but feel optimistic for the future:

"…the changes are very positive and fits with ICIMOD's mandate for peace and prosperity. Donors will come back. ICIMOD should use this opportunity especially in developing rural employment and income generating programmes together with our partners in Nepal. We cannot work on conflict, but [ICIMOD] should facilitate peace building and income generation."

Indeed, with the declaration of talks between the political parties and the Maoists, Nepal is venturing on the long road toward lasting peace and development.

**Srabani Roy, will be leaving the Centre this summer to pursue a Master's degree in Journalism in the United States.*

ICIMOD congratulates the people of Nepal, our host country, for the monumental changes they were able to bring about through the recent people's movement.

The Centre hopes that with positive political changes, the country will move towards permanent peace, which will contribute to alleviating poverty in this mountain nation.

Milan Raj Tuladhar, *Director Administration and Finance*

Memoranda of Understanding and Agreements

January-April 2006

- March 2006, with the Department of Meteorology, Stockholm University (MISU), and the United Nations' Environment Programme, Regional Resource Centre, Asia and Pacific (UNEP, RRC.AP) concerning the characterisation of light – absorbing particulate matter in air and precipitation.
- April 10, 2006, with the Centre for Integrated Rural Development for Asia and the Pacific (CIRDAP) for collaboration in major thematic areas in support of the mandated functions of CIRDAP and ICIMOD
- April 16, 2006, with the Institute of Mountain Hazards and Environment (IMHE), Chinese Academy of Sciences, for collaboration in major thematic areas in support of the mandated functions of IMHE and ICIMOD
- April 16, 2006, with the Kunming Institute of Botany, Chinese Academy of Sciences (KIB), for collaboration in major thematic areas in support of the mandated functions of KIB and ICIMOD

CIRDAP, Bangladesh

Exchanging MoUs, Dr. J. Gabriel Campbell, Director General ICIMOD, and Dr. Durga P. Paudyal, Director General CIRDAP

Research Updates & Project News

Ecological status of rivers in the HKH as a basis for sustainable water use

In April 2005, ICIMOD and partners introduced a three-year research project to assess and evaluate the ecological state of rivers in the Himalayan region (ASSESS-HKH). The project, funded by the European Commission, brings together academic and research institutions from Austria, Czech Republic, Germany and Bangladesh, Bhutan, India, Nepal, and Pakistan, led by the University of Natural Resources and Applied Life Sciences (BOKU) in Vienna, Austria.

The study uses aquatic macro-invertebrates – bottom-dwelling river fauna such as mussels, clams, snails, and insects – to assess the rivers' ecological state. These organisms help measure a variety of types of human-induced deterioration, for example, organic pollution, acidification, habitat modification, and overall river deterioration and disturbances. Communities in disturbed river reaches will be compared with communities under near-natural conditions. Two main pressures: organic pollution and flow alteration due to river damming and engineering will be analysed.

Some 187 river sites in five ecoregions (Himalayan subtropical pine forest, Western Himalayan broadleaf forest, Eastern Himalayan broadleaf forest, Upper Gangetic plains' moist deciduous forest, and Lower Gangetic moist deciduous forest) have been selected for the study. To include seasonal aspects, sampling is taking place in two seasons: pre and post monsoon. The first sampling has been completed in all the participating countries, processing work has commenced on the collected samples. Out of the findings, an HKH Eco-data management tool (ECODAT) will be developed and river quality maps will be produced, which will provide the basis for a policy recommendation for an HKH transnational programme for monitoring rivers and streams for sustainable water use.

Mandira Shrestha <mshrestha@icimod.org>

Mandira Shrestha

Sampling demonstration in the Old Brahmaputra River, Bangladesh

Inception meeting marks a ground-breaking partnership to save mountain wetlands

ICIMOD, together with partners from the United Kingdom, The Netherlands, and India, has started a two-year project co-funded by the EuropeAid Cooperation Office on the conservation and judicious management of high altitude wetlands. The project was launched in an inception meeting in Kathmandu, Nepal from 27 February-2 March 2006, where the partners agreed on steps to take to implement the new 'Asian ProEco Project'.

The project is led by Wetlands International and will deliver a new wetland knowledge base for Nepal and neighbouring countries, measure the risks of wetland loss, and promote integrated

water resource management based on state-of-the-art remote sensing by satellite and water flow data. The project brings conservation and water managers together to share their knowledge to improve information among countries that share the region. Conservation and judicious use of wetlands require international cooperation. The project will improve the capacities of partner organisations and selected communities in Nepal, Bhutan, China, and India to enable them to achieve this objective.

Jianchu Xu <jxu@icimod.org>
Rajendra Shilpakar <rshilpakar@icimod.org>

Living with risks: sharing knowledge on disaster preparedness in the Himalayan region

Recent disasters such as the earthquake in Pakistan, the Asian tsunami in December 2003, and floods in various parts of the world have steered interest in the international community for improving disaster management and preparedness. As a response, ICIMOD has begun collating disaster preparedness information in the region through a project called, 'Living with Risks – Sharing Knowledge on Disaster Preparedness in the Himalayan Region'. The project supports key practitioners with current knowledge in disaster preparedness and builds capacities in multi-hazard risk assessment as well as providing a platform to exchange experiences. Participating countries include Bangladesh, India, Nepal, and Pakistan.

The project builds on ICIMOD's years of work and knowledge building on reducing the vulnerabilities of mountain communities and is derived from the 'Hyogo Framework for Action 2005-2015'. The document identifies the 'need to enhance international and regional cooperation in disaster risk reduction through 'use of knowledge, innovation, and education to build a culture of safety and resilience at all levels'. The project is supported by the European Commission Humanitarian Aid Department (DG ECHO) and will be implemented from 1 April 2006 to 30 June 2007.

Vijay Khadgi <vkhadgi@icimod.org>
Mats Eriksson <meriksson@icimod.org>

Exchange delegation from Afghanistan


Sudas Sharma

A delegation from Afghanistan's Ministry of Agriculture, Animal Husbandry and Food (MAAHF) visited ICIMOD from 1 March to 8 April to be familiar with ICIMOD's work and to identify opportunities for joint projects in support of the Ministry's Five-Year Development Plan. During the five-weeks, the delegation participated in short courses on GIS/RS, project proposal development, multimedia application in beekeeping, and were oriented on Information and Communication Technology (ICT) for Development, and knowledge management in policy development. The team conducted an in-depth study of components of ICIMOD's Demonstration & Training Centre, Godavari.

The delegation also participated in consultations and discussions with specialists and staff of ICIMOD's integrated programmes. The discussions served to provide both a general orientation on ICIMOD's activities and different areas of integrated mountain development and to identify possible areas of collaboration. The delegation made a joint presentation of their findings before the ICIMOD staff and made recommendation and future plans for collaboration. As an immediate outcome of their visit, the delegation signed an agreement to establish a Publications Exchange Programme (PEP) agreement on behalf of the Ministry of Agriculture, Animal Husbandry and Food. ICIMOD provided 261 titles, including electronic versions (CD-ROMs) for the Ministry's Library/Resource Centre.

Zbigniew Mikolajuk <zmikolajuk@icimod.org>

Workshops, Meetings and Training Courses

National consultation on a law for Nepal on access and benefit sharing from genetic resources

ICIMOD's Culture Equity, Gender and Governance Programme in collaboration with the Ministry of Forests and Soil Conservation (MoFSC) organised a national consultation on access and benefit sharing of resources (ABS) in Kathmandu, Nepal in January 2006. The consultation focused on the status of implementation of the Convention on Biological Diversity in the eastern Himalayan countries and the draft access and benefit sharing law for Nepal. Senior government policy-makers, representatives of NGOs, civil society, and indigenous/local communities attended. Comments and suggestions from the participants will be considered in the review of the draft final law, which will then be processed by the MoFSC, Nepal.

Krishna Prasad Oli <koli@icimod.org>

ICIMOD participates in the National Honey Fair

ICIMOD's honeybee project participated in the National Honey Fair organised by the Nepal Beekeepers' Association in Ratnanagar, Chitwan district, Nepal in January 2006. About three dozen beekeeping enterprises and cooperatives organised stands at the exhibition demonstrating beekeeping technologies and selling honey, beeswax, and other honeybee products. The Nepal Beekeepers' Association displayed colonies of honeybees in different types of beehives and educational materials, including posters and videos. Over a thousand people visited the fair – considered a milestone in promoting the domestic market for honey and other bee products. ICIMOD provided financial support to the Nepal Beekeepers' Association for the Fair. The ICIMOD honeybee project also attended a seminar on the honey market in Nepal and met some beekeeping entrepreneurs.

Surendra Joshi

The Honey Fair

Surendra Joshi <sjoshi@icimod.org>

Shangri-La National Park and a workshop on sustainable tourism

The Diqing Tibetan Autonomous Prefecture is one of 10 Tibetan Autonomous Prefectures in China and lies in the hinterlands of the Three Parallel Rivers', an area on China's World Natural Heritage list. The prefecture is located at the heart of the heritage site, and is rich in scenic beauty, biodiversity, and culture. The Prefecture has been receiving attention from organisations such as The Nature Conservancy, Centre for Biodiversity and Indigenous Knowledge, and WWF-China for its valuable biodiversity. In recent years the Ka Wa Gabo area, along with surrounding Jhongdian and Lijiang areas, have attracted both domestic and international tourists. Owing to the area's tourism and conservation potentials, the local Vice Governor of the Prefecture and the Yunnan Mountain Heritage Foundation organised a two-day workshop to discuss modalities for creating

China's first National Park, focusing on ecotourism as an means of conservation and economic development for marginalised and deprived people of the Prefecture.

ICIMOD provided inputs and expertise in a two-day workshop in mid-January in Zhongdian, Kunming to build a broad-based strategy for establishing the Shangri La National Park. The objectives were to define a roadmap, tradeoffs and critical options for the area's economic development, and present pros and cons of ecotourism development from other parts of the world. Support from international organisations for the initiative is being sought. ICIMOD made a presentation on 'Recreational Use of Protected Areas While Maintaining Their Values: Essence and Challenges.' The Centre is considering to develop an informal network of organisations working in the Shangri-La National Park and to solicit technical expertise. Informal discussions were also held to initiate transboundary biodiversity management activities in Diban-Dihang-Ka Wa Gabo-Hkakaborazi Complex.

Nakul Chettri <nchettri@icimod.org>

Training trainers on organic production and management of NTFPs and medicinal and aromatic plants

ICIMOD's Medicinal and Aromatic Plants Programme in Asia (MAPPA) organised a training of trainers workshop on organic production and management of medicinal and aromatic plants in February 2006. Dr. A. Thimmaiah, Director, Natura Agroconsultants Pvt Ltd, and trainer and organic certification consultant for the MAPPA projects in India, conducted the workshop. The goal was for trainees to transfer what they learned from the course to the field. Twenty-three participants, including four from ICIMOD and trainees from the government, NGOs, community-based organisations and the private sector participated.

The programme included theoretical and practical sessions and demonstrations on plant tonics. Farming activities carried out according to the bio-rhythms of nature were discussed and the participants shared experiences from their respective regions. ICIMOD/MAPPA immediately followed up this training course by organising a training of trainers' programme for members of 18 community forestry user groups (CFUGs) in Baitadi district of Western Nepal. CFUGs manage the 'Jaivik Jadibuti' project supported by MAPPA, CCO and CECI in Western Nepal.

Dyutiman Choudhary <dchoudhary@icimod.org>

Second phase of capacity building for community-based organisations in the Himalaya begins

A regional inception workshop initiated the second phase of 'Capacity Building for Community Based Organisations in the Himalayas' project in January 2006 in Kathmandu. Participants from six countries (Bangladesh, China, India, Myanmar, Nepal and Pakistan) attended. The main agenda was to finalise the working modality for the second phase. The workshop drew the clear outlines for operational strategies, approaches, and potential activities for the next three years.

Nani Ram Subedi <nsubedi@icimod.org

Govinda Shrestha

Thinking of how to make the second phase even more productive

Creating awareness about legal rights for environmental justice

J. Mijin Cha

Leaders of local organisations gathered at the Trinamul offices in Khagrachari, Bangladesh, to discuss issues of environmental justice at the community level.

In seeking to advance the rights of minority communities to environmental justice in the Himalayas, ICIMOD, with support from the Ford Foundation, is developing a resource-cum-training manual to create awareness on legal rights and tools for accessing justice. A trial training session to receive feedback on the draft manual was organised in collaboration with the Trinamul Unnayan Sangstha in Khagrachari district of the Chittagong Hill Tracts in Bangladesh on 6 March 2006. Local NGOs in Khagrachari participated, providing feedback on the manual as well as contextualising issues of access to natural resources in the framework of environmental justice.

J. Mijin Cha <mcha@icimod.org>
Radhika Gupta <rgupta@icimod.org>

A milestone for potential collaboration between NERIWALM and ICIMOD

The North East Regional Institute for Water and Land Management (NERIWALM) in Tezpur, Assam (India), is an autonomous research for development institute under the North Eastern Council (NEC), Government of India. The Institute carries out training and research on land and water management in eight states of the North Eastern region. NERIWLAM organised a 'Regional Workshop on Soil and Water Conservation' in March at Tezpur to contribute to Vision North East Region 2020. ICIMOD was invited to participate.

NERIWALM, India

The NERIWALM workshop participants

Dr. Sanjeev Bhuchar and Mr. Keshar Man Sthapit from the PARDYP-ICIMOD represented the Centre and presented papers on 'Soil and Water Conservation and Technologies: Lessons from PARDYP' and 'Decentralisation and Governance in the Field of Soil Conservation and Watershed Management Nepal'. Professor S.C. Patra, Director, NERIWLAM, in conclusion expressed the need to document good practices on soil and water conservation and asked for ICIMOD's support and expertise to achieve this.

Sanjeev Bhuchar <sbhuchar@icimod.org>
Keshar Man Sthapit <ksthapit@icimod.org>

Assessing the first UN decade of indigenous peoples in Bangladesh

In the last decade, the issues facing the world's indigenous peoples have received greater visibility and attention. The links between their continued marginalisation, lack of rights, and persistent poverty have been acknowledged. International initiatives have tried to address the problems faced by indigenous peoples. One of the most visible of these has been the First United Nation's Decade of Indigenous Peoples, 1995-2004. While much was achieved at the international level in the creation of spaces for indigenous peoples to voice their concern, most significant amongst which is the 'Permanent Forum on Indigenous Issues', many areas concerning their rights and livelihoods still require urgent attention. Recognising this, a second Decade of Indigenous Peoples was proclaimed in 2005. This offers a timely opportunity to reflect upon the achievements as well as the outstanding challenges of the first decade.

ICIMOD has formed a partnership with the Tebtebba Foundation in the Philippines to carry out an assessment of the first UN Decade of Indigenous Peoples (1995-2004) in 10 countries in Asia with the support of IFAD. The perceptions and viewpoints of indigenous peoples and organisations representing them are critical for analysing the first Decade. Towards this end, ICIMOD in collaboration with the Bangladesh Adivasi Forum organised a consultation workshop in Dhaka on 9 March. Representatives from indigenous people's organisations, researchers from the University of Dhaka, and eminent scholars and activists participated and reflected on the changes in the status of issues faced by indigenous peoples in Bangladesh in the past decade. A set of recommendations was put forth to guide the development of programmes and strategies for the second decade.

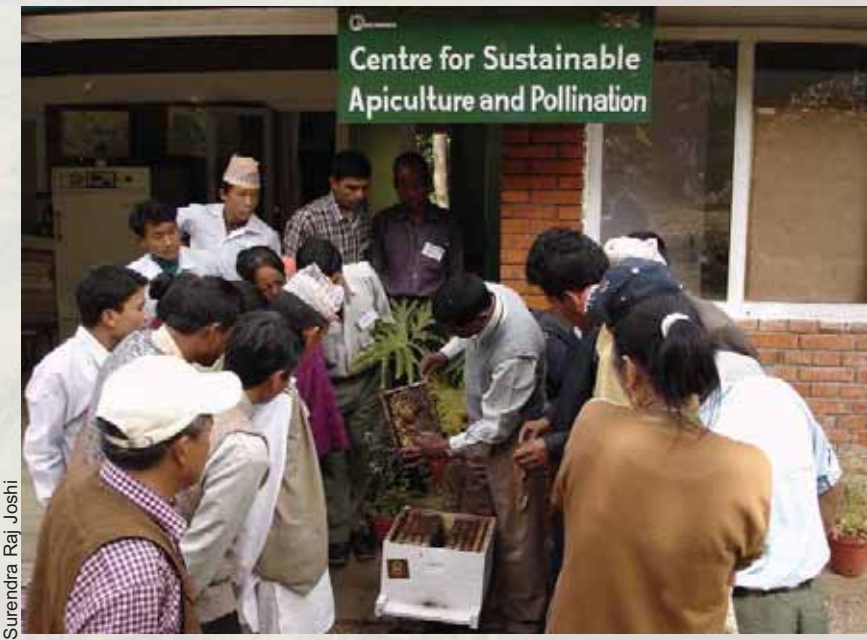
Radhika Gupta <rgupta@icimod.org>

Training on 'Colony Management, Queen Rearing, Hive Making, and Processing of Bee Products'

A three-week training on colony management, queen rearing, hive making, and processing of bee products was organised in March in collaboration with the District Roads' Support Programme (DRSP) of the Swiss Development Cooperation (SDC). This is part of upscaling the project and aimed to improve the skills of grassroots beekeepers. Twenty-five participants from eight Nepal districts attended.

The training was practical and engaging rather than theoretical and dogmatic. Participants were shown how to make moveable frame hives, produce queen cells, inspect colonies, and carry out seasonal management, catching, and hiving of swarms and how to unite and divide bee colonies. Bee diseases and pests, major bee flora, and pollination services were also discussed. In some sessions participants exchanged experiences especially in production of value-added products.

Surendra Joshi <sjoshi@icimod.org>



Surendra Raj Joshi

Beekeeping training at the ICIMOD Demonstration and Training Centre, Godavari

Lamjung district enjoys the multiplier effects of bio-briquette training

Two staff members of Sarbodaya Sewashram, a local NGO based in Lamjung district, Nepal received hands-on training on beehive bio-briquette making from ICIMOD. After training the NGO reproduced over 2000 leaflets on briquette making and its benefits, which they distributed to farmers, government agencies, and other NGOs working in Lamjung district. Sarbodaya Sewashram also conducted two days training for community forest user group members of Kataharbhari, Harbotte VDC, for local representatives of Ghausahar VDC and Maharudhara Women's group of Dhamilikuwa VDC in Lamjung district. Altogether 154 participants from three VDCs were trained. Most of the participants have started to make bio-briquettes for household use and for income. A briquette selling center has been established in Lamjung to help in their marketing.

Sarbodaya Sewashram plans to provide more training on making bio-briquettes to women's groups and forest user groups.

Samden Sherpa <ssherpa@icimod.org>

Sarbodaya Sewashram, Nepal

Training in session... and finished products

Training and workshop on remote sensing

ICIMOD, together with the United Nations Office for Outer Space Affairs and the European Space Agency (ESA) organised a training cum workshop for remote sensing projects in the HKH, followed by an experts meeting in Kathmandu, 6-10 March. Thirty participants from Bhutan, India, and Nepal took part. The experts meeting follows up on a workshop on remote sensing in mountain areas hosted by ICIMOD in 2004. The meeting hopes to implement a new module for ESA's Eduspace programme, 'Himalayas from Space'. Satellite-based remote-sensing projects relevant to the region were also reviewed.

Narendra Bajracharya

Pradeep Mool <pmool@icimod.org>

Other MENRIS training courses

Geo-Informatics for Census Application for the Census Commissioner's Office, Bhutan
ICIMOD, Kathmandu, Nepal Supported by the UNFPA, Bhutan office. 9-20 January 2006

GIS for Forest Management at the Institute of Forestry, Pokhara, Nepal
20 February-3 March 2006

Basic GIS Training for Afghani delegates from the Ministry of Agriculture, Kabul, at ICIMOD, Kathmandu, Nepal, 15-21 March 2006

GIS for Forest Resources Management for 14 foresters in the Forest Institute, Pakistan
20-23 March 2006

Earthquake training cum workshop and policy level seminar for Pakistan

Any effort to rebuild the earthquake-affected areas of Pakistan requires an in-depth understanding of the causes, effects, and associated hazards of earthquakes. To contribute to planning for rehabilitation and reconstruction, ICIMOD and the National Centre of Excellence in Geology of Pakistan (NCEG - P), in collaboration with the International Institute of Geo-Information and Earth Sciences (ITC), the Netherlands, and the Asian Disaster Preparedness Centre, Bangkok, organised a training cum workshop in March at the Pakistan Academy of Sciences, Islamabad, Pakistan from 13 to 31 March.

The training/workshop focused on institutional strengthening to use innovative approaches and tools for institutions and organisations engaged in earthquake rehabilitation and reconstruction. Thirty-four participants from 21 institutions went through training. A policy-level seminar was also organised on the last day to familiarise policy decision-makers with geospatial tools to mark the concluding ceremony of the training course. The programme was chaired by Mr. Muhammad Ismail Qureshi, Secretary, Ministry of Food, Agriculture, and Livestock (MINFAL) of Pakistan and current Chairman of the ICIMOD Board of Governors. The Chief Guest was Prof. Dr. Atta-ur-Rehman, Federal Minister and Chairman, Higher Education Commission (HEC) of Pakistan.

Gauri Shankar Dangol

Training participants verify remote sensing data on the rubble of a village in Balakot, Pakistan

Gauri Shankar Dangol

The policy level workshop on 'Earthquake Vulnerability and...Geospatial Tools for Rehabilitation and Reconstruction' in Pakistan

Pradeep Mool <pmool@icimod.org>

National training on 'Spatial Tools for Planning and Development for Afghanistan: Applications in Environment and Natural Resources' Management'

A national training course on 'Spatial Tools for Planning and Development for Afghanistan' was held in Kabul in mid-March, jointly organised by ICIMOD's MENRIS Division and the Afghanistan Information Management Services (AIMS)/UNDP. The course aimed to build the capacity of government organisations in Afghanistan in the use of GIS technologies useful for rebuilding the country. Altogether 40 participants from 16 government institutions from different regions of Afghanistan participated. Coverage on the training can be viewed at the UNDP website:

http://www.undp.org.af/media_room/feature_stories/fs_aims_hitech_geo_train.htm

Sushil Pradhan <suspradhan@icimod.org>

Sushil Pradhan

Training in Afghanistan Information Management Services (AIMS)/UNDP, Kabul, Afghanistan

Training on herb farming management

The Agricultural Training Directorate of the Government of Nepal organised a week-long training programme on the management of herb farming in March. The training course was for district agricultural development officers and agricultural extension workers in 10 districts of Nepal.

ICIMOD/MAPPA held a session on 'Medicinal Plants: Availability, Status, and Management Issues in Nepal'. Participants were introduced to the distribution patterns of wild medicinal plants in Nepal and their uses in different systems of medicine. MAPPA is developing strategic linkages with the Ministry of Agriculture to promote the cultivation and management of MAPs in different parts of Nepal through capacity building programmes.

Dyutiman Choudhary <dchoudhary@icimod.org>
Nirmal Bhattarai <mansa@ccsl.com.np>

A seminar on sustainable use and management of natural resources

A seminar on Sustainable Use and Management of Natural Resources in Hills and Mountains of South Asia: Challenges, Opportunities and the Way Forward was held in Chittagong, Bangladesh on 12 April 2006. ICIMOD and the Bangladesh Forest Research Institute jointly organised the seminar, which provided a forum for sharing and disseminating emerging knowledge and experiences in the management of natural resources in the region. The aim is to sharpen understanding in addressing the emerging challenges of natural resource degradation, environmental deterioration, and growing inequalities and poverty. Over 40 participants from different organizations including the government, NGOs, development agencies, research institutes and universities participated. For effective management of natural resources, participants emphasised the need to involve local communities in decision-making in natural resources management as well as to share cross-country learning.

Golam Rasul <grasul@icimod.org>

A Poem

Go to Hills and Mountains

Jafar Ahmed Chowdhury

Hills and Mountains
Their heights and vastness
Mankind can learn
How to acquire nobleness.

Mind when congested
Heart full of sadness
See hills and mountains
Those will be filled with greatness.

Generously they bestow
Potentialities and ecology
Man should manage properly
Their rich biodiversity.

Timber, water, minerals
Contained in hills and mountains
Rich culture people have
Those mankind should sustain.

Oh hills! Oh mountains!
I go to you once and again
For the benefits of all life
Energy of life, I regain.

Chittagong: 12 April, 2006

Mr. Jafar Ahmed Chowdhury, Secretary, Ministry of Environment & Forests (MoEF), Government of the People's Republic of Bangladesh, is an environmentalist and mountain lover. Mr. Chawdhury was invited to be the Chief Guest at the ICIMOD-BFRI Workshop and as part of his speech he instantly composed a poem lauding the values we derive from mountains– this also speaks of his support for ICIMOD.

DPRK delegation expresses interest in ICIMOD

His Excellency, Mr. Hwang Yong Hwan, Ambassador of the Democratic People's Republic of Korea (DPRK), and delegates from the National Coordinating Committee for the Environment (NCCE), DPR of Korea, Dr. Ri Hung Sik, Mr. Ri Hyong Chol, and Mr. Kim Yun Hum visited ICIMOD on 15 February and discussed possible areas of cooperation on mountain issues.

Outreach Activities

ICIMOD observes World Environment Day 2006

ICIMOD observed World Environment Day on the 5 June 2006 by organising various programmes around this year's theme: Deserts and Desertification, Don't Desert Drylands!

In the morning, ICIMOD participated in a programme organised by the Ministry of Environment, Science and Technology (MOEST) of the Government of Nepal at the Birendra International Convention Centre. This was also the occasion to launch the joint Asian Development Bank (ADB) and ICIMOD publication 'Environmental Assessment of Nepal: Emerging Issues and Challenges' and the conservation web portal 'Biodiversity of Nepal' (at http://biodiversityofnepal.icimod.net). The portal was developed by ICIMOD in collaboration with IUCN-Nepal and the Department of National Parks and Wildlife Conservation.

Along with 27 other organisations, ICIMOD also took part in a three-day exhibition organised by MOEST, where our books and the conservation and biodiversity portal provided good exposure for ICIMOD's work on watershed management, land degradation and management, biodiversity, agriculture, and rural energy to students, professionals, and the general public visiting our booth.

In the afternoon, a special programme was organised at the ICIMOD Headquarters for staff and visitors on the theme: caring for the world's vast arid and semi-arid lands or drylands. The programme included presentations on 'Development Issues in Afghanistan' by Dr. Andreas Schild, on the ADB-ICIMOD Environmental Assessment publication, the Mountain Environment Knowledge Hub Initiative, and the Conservation Portal. ICIMOD and the Mountain Forum also announced the results of the ICIMOD photo contest: 'Deserts and Desertification in High Altitude Areas', where 132 entries were received from participants in 37 countries including Nepal, India, Pakistan, and China, from the region, and Kenya, Egypt, Chile, Afghanistan, Venezuela, Columbia, Bolivia, Argentina, and the USA. The photos were on exhibition at the ICIMOD Headquarters for more than a week and can be viewed at the on-line photo gallery at <http://www.mtnforum.org/apmn/wed2006-dpc/index.php>. Winners in the photo contest were later announced (see 'Winners' in box). Photos of the World Environment Day celebration are on the back cover of this issue.

Winners

ICIMOD and Mountain Forum Photo Contest

Deserts and Desertification in High Altitude Areas

Dr. Jutta U Kern

The 'Mountain Forum Global Prize' for her entry: *'Harvesting the High Desert'* taken in Horque, Tibet Autonomous Region, China in 2001

Karl Schuler

The 'ICIMOD Himalayan Prize' for his entry: *'Boon and Bane of Water'* taken in the Bagrot Valley, Karakorum Range, Northern Areas, Pakistan in 2004.

Schuler has his own photographic homepage at: http://www.photo.net/photos/karlschuler

Nira Gurung <ngurung@icimod.org>
Bidya Banmali Pradhan <bbanmali@icimod.org>

ICIMOD readership survey 2006

Readers find ICIMOD publications useful and relevant

ICIMOD conducts readership surveys periodically to ask our readers and partners how they find ICIMOD publications and if they are relevant and applicable to their work. We also seek suggestions on how we may further improve our published and on-line information materials. The results are used in long-term publications planning and development. Readership surveys were conducted in October 1995, June 1998, October 2002, and most recently in the first quarter of 2006. Specifically, the 2006 Readership Survey sought to find out:

- How useful ICIMOD publications are for our partners,
- Where and in what way and for what purpose readers and partners have used the publications,
- What impacts have been felt and differences made as a result of using the information contained in ICIMOD publications, and
- Readers' suggestions and comments on how to further improve publications.

The survey questionnaire was sent to members of ICIMOD's recent mailing list (update 2005) and to selected activity partners; more than one thousand people and organisations.

The detailed analysis is underway, but already, the preliminary results are very encouraging. More than one-third of readers responded, a good indicator in itself of interest in ICIMOD publications. Nearly all the respondents stated that they had benefited from the publications; more than eighty per cent rated their usefulness high. Ninety per cent rated the overall quality as very good or excellent. More than half of the respondents would like to have more publications on good practices, and a quarter wanted more basic studies. Suggestions for improvements included topics and geographical areas to be covered, longer books with more detail, and more short summaries. Many respondents suggested improving on-line access and providing access to databases. A surprising ninety per cent of respondents looked at general publications on the website, although they still liked to receive a printed copy, and three-quarters would use the on-line facility to view technical publications if available.

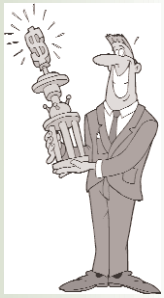
The 2006 Readership Survey was a collaborative effort of the Information and Knowledge Management (IKM) and Policy and Partnership Development (PPD) Programmes. A full report of the findings and their interpretation will be published in the next issue of the newsletter.

Nira Gurung <ngurung@icimod.org>
Farid Ahmad <fahmad@icimod.org>
A. Beatrice Murray <bmurray@icimod.org>
Shobhana Ghimire <sghimire@icimod.org>

Winners

PRIZE DRAW

ICIMOD Readership Survey 2006



1st Prize

Prof. G.D. Sharma
Nagaland University, India
(Gets US$50 worth of ICIMOD Publications)

10 Consolation Prizes

Mr. Mohammad Kamal Hossain, Institute of Forestry and Environmental Sciences, Bangladesh
Dr. Jack Ives, Canada
Mr. Roshan M. Bajracharya, Kathmandu University, Nepal
Mr. Bhesh Nath Sapkota, Nepal Population Association, Nepal
Mr. Labh Singh Sen, India
Mr. C. Rossel, Italy
Mr. Krishan Pd. Thapaliya, Kavre Multiple College, Nepal
IUCN Nepal
Mr. Mesfn Giorgis, Bureau of Finance and Economic Department, Ethiopia
Mr. Blesilda M. Calub, University of the Philippines, Philippines

(To each, a DVD film on the ICIMOD Demonstration and Training Centre, Godavari)

Congratulations to all!

Global Mountain Forum Secretariat

Mountain Forum launches a new membership system

The new Mountain Forum membership database is now available and can be accessed from the following links. Membership Database - Individuals: http://www.mtnforum.org/rs/mem/searchind.cfm
Membership Database - Organisations : http://www.mtnforum.org/rs/mem/searchorg.cfm
Membership Updates : http://www.mtnforum.org/rs/mem/update.cfm

In the future, Mountain Forum members will be able to create personal webpages through a unique web address (URL) which they can use to publicise their work.

MF online library goes live!

The online library is finally live, with many new added features at <http://www.mtnforum.org/rs/ol.cfm>. Related links have also been added in the section on Resources and Services. MF continues to work on the Library and add other features such as tips for effective searching, and improving the organisation of materials in the periodicals, reference, and web resources. Send us your feedback at <library@mtnforum.org>

Ujol Serchan

Reaching out to the grassroots in the Shivapuri National Park

Mountain Forum 10th anniversary e-consultation

On the occasion of its 10th anniversary, Mountain Forum carried out a global e-consultation on achievements, progress, and the future of the network. Over a hundred members from 30 countries participated in the 20-31 March consultation, moderated by Dr. Ismail Khan, MF board member from the Asia-Pacific network.

ICIMOD's work in the HKH was highlighted in comments from Pakistan, India, China, and Korea. Cases from HKH and other mountain regions illustrating the benefit of MF membership, and methodologies and indicators for monitoring impact were discussed, as well as innovative ideas on how to enhance grassroots outreach and diversify the linguistic and geographic coverage of the network.

'Dialogue with the Grassroots' short-listed as a finalist for the Stockholm Challenge

'Dialogue with the Grassroots', a radio project by Mountain Forum, the Asia-Pacific Mountain Network, and Radio Sagarmatha (the oldest community radio station in South-Asia) – was short-listed as a finalist for the Stockholm Challenge. The Stockholm Challenge is the premier award for innovation in using information and communication technologies (ICTs) for development (www.stockholmchallenge.se). Over a 1,000 entries were received from around the world; only about 100 entries make it as finalists. The project is in effect already one of the best 50 ICT-related projects in 2005. For more information on this project please visit: http://www.mtnforum.org/apmn/radio_index.htm.

Mountain Forum Secretariat, C/O ICIMOD, Khumaltar, GPO Box 3226, Kathmandu, Nepal

MAPPA Pakistan team on a study tour to Nepal

A team of 14 persons from the MAPPA Project in Pakistan visited Kathmandu from 28 March-2 April for a study and observation tour. The objective was to orient and expose the team to practical experiences in the field of NTFP/MAP based conservation and sustainable management in Nepal. The delegation met with experts from NGOs/INGOs, government agencies, and the private sector and had discussions on conservation, equitable commercialisation, traditional medicine, marketing, organic cultivation, and institutional and policy innovations in the NTFP/MAP sub sector in Nepal.

The visit provided opportunities for information exchange and cross-sharing of experiences between MAPPA projects in the two countries and opened avenues for future collaboration.

Dyutiman Choudhary <dchoudhary@icimod.org>

Recent ICIMOD Publications

Major documents published between January and May 2006 are shown below. The three prices quoted are applicable to developed countries, developing countries, and ICIMOD's regional member countries respectively, and include post and packing. Publications are available at a reduced rate at the Centre itself. Publications can be provided free-of-charge to institutions actively involved in sustainable development of the greater Himalayan region. Order on-line (see below) or from the Distribtuion Unit <distri@icimod.org>

ADB/ICIMOD (2006) **Environment Assessment of Nepal: Emerging Issues and Challenges.** Kathmandu: Asian Development Bank and ICIMOD, 224p
ISBN 92-9115-004-5
Price: US$ 30/ 25/ 15

The Environment Assessment of Nepal, published jointly by ADB and ICIMOD, brings together a large part of the available data to provide an analysis of environmental status and trends in the country; the policy, legal and institutional framework for environmental management; financing mechanisms; and major environmental issues and opportunities. The Assessment highlights data inconsistencies, gaps, and needs, and the extensive list of sources provides an excellent starting point for anyone attempting to locate relevant environmental data.

Gyamtsho, P. (ed) (2006) **Securing Sustainable Livelihoods in the Hindu Kush-Himalayas: Directions for Future Research, Development and Cooperation, ICIMOD 21st Anniversary Symposium**, 188p
ISBN 92-9115-007-X Price: US$15/10/7.50

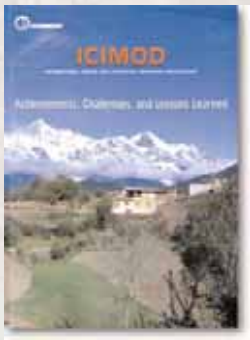
At the end of 2004, ICIMOD celebrated its 21st Anniversary and the inauguration of its new building with a symposium on 'Securing Sustainable Livelihoods in the Hindu Kush-Himalayas: Directions for Future Research, Development and Cooperation'. Keynote presentations, panel contributions, and discussions together provided reflections on the Centre's achievements over the past two decades, the contributions that ICIMOD has made towards the improvement of regional cooperation and knowledge sharing, a look at future challenges in the HKH region, and recommendations to guide future work. This book contains the proceedings of the symposium.

Gyamtsho, P.; Singh, B. K.; Rasul, G. (eds) (2006) **Capitalisation and Sharing of Experiences on the Interaction between Forest Policies and Land Use Patterns in Asia: Linking People with Resources,** ICIMOD Partnership Platforms 2/06, **Vol. 1: Proceedings Summary**, 43p, ISBN 92-9115-003-7 **Vol. 2: Technical Papers**, 154p. ISBN 92-9115-008-8
Price each separately: US$ 10/7/5
Price together: US$ 15/10/7.50

In 2005, SDC held a workshop on 'Capitalisation and Sharing of Experiences on the Interaction between Forest Policies and Land Use Patterns in Asia', in partnership with ICIMOD, RECOFTC, and GTZ. The aim was to improve

ICIMOD publications on-line – order direct at
http://www.icimod.org/publications/pubmenu.htm
http://www.panaseanemall.org/shop/icimod.htm
http://www.earthprint.com/icimod

policy and institutional frameworks for comparing and scaling up good practices in community-based natural resource management, with a focus on learning from community forestry in Nepal. These two volumes contain a summary of the proceedings.



ICIMOD: Achievements, Challenges and Lessons Learned. Kathmandu: ICIMOD, 74p
ISBN 92-9115-002-9
[available on request]

The book provides a candid reflection of the experiences gained, achievements, and limitations of the International Centre for Integrated Mountain Development after more than 20 years and looks at the organisation's options for the future.

Merz, J; Doppman, G. (2006) **Measuring Mountain Stream Discharge Using the Salt Dilution Method**: a Practical Guide [online publication]

This guide raises awareness of the salt dilution method for practitioners carrying out hydrological studies, erosion assessments, and water resource management of Himalayan mountain streams. It outlines the theory and gives details of the practical steps to be used in the field. It is based on a manual in German edited by the Swiss Hydrological and Geological Survey in Berne/Switzerland, and the authors' experiences.

Gyamtsho, P.; Nyima, T.; Kaiser, K.; Richter, J. (eds) (2005) **Sustainable Rural Development in Mountainous Regions with a Focus on Agriculture in the Tibet Autonomous Region.** Published by InWEnt Capacity Building, Germany
This book documents the proceedings of an

international conference on 'Sustainable Rural Development in Mountainous Regions with a Focus on Agriculture in the Tibet Autonomous Region (TAR)' held in July 2004 in Lhasa, hosted by the Tibetan Academy of Agricultural and Animal Sciences (TAAAS) and organised by InWEnt Capacity Building International, Germany, the European Union-supported Panam Integrated Rural Development Project (PIRDP), and ICIMOD. The conference reviewed the socioeconomic progress made by TAR in its rural mountain areas and provided a platform for sharing experiences from other similar regions with the aim of identifying suitable policies and strategies for agriculturally-related sustainable development. [Available on request]

Zurick, D.; Pacheco, J.; Shrestha, B.; Bajracharya, B. (2005) **Atlas of the Himalaya**, 96p
ISBN 92-9115-224-2
Price: US$20 (ICIMOD member countries)

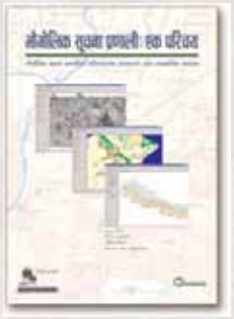
The Atlas of the Himalaya was prepared to support understanding of Himalayan geography and development activities in the region and is the outcome of a collaboration between the University of Eastern Kentucky, USA, and ICIMOD. It is designed for use by researchers and practitioners, as well as those interested in the region in general. The Atlas provides information on characteristics of physical geography, geology, climate, and natural hazards, as well as sociocultural and historical descriptions. The Atlas highlights the Himalaya as an important resource base and underscores the need for conservation

ICIMOD E-news
http:www.icimod.org/enews/index.htm
• Ninth Issue December2005 /January 2006
• Tenth Issue February /March 2006 • Eleventh Issue April/May 2006

of the mountain ecosystem to go hand in hand with development. This edition is for regional distribution only.

Andersen, P.; Tuladhar, J. K.: Karki, K. B. (2005) **Micronutrients in South and South East Asia**: Proceedings of an International workshop held on 8-11 September 2004, Kathmandu, Nepal. 239p
ISBN 92-9115-210-2
Price: US$ 20/15/10

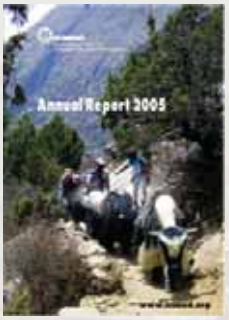
This publication documents the proceedings of a workshop on 'Micronutrients in South and South East Asia' held in Kathmandu in September 2004. The book provides a comprehensive picture of the complexities of micronutrient issues and measures to address the problems . With this publication, ICIMOD hopes to share this knowledge with people throughout the world concerned with soils, agriculture, and human nutrition in developing countries.



Shrestha, B.; Bajracharya, B; Pradhan, S. (2005) **GIS for Beginners**: Introductory GIS Concepts and Hands-on Exercises. 102p
ISBN 92-9115-238-2
Lang: Nepali
Price: US$ 20/15/10

This book provides introductory reading material on GIS suitable for a wide-range of audiences and, together with the CD-ROM, can be used as the basis for a short training course.

General Publications



1. Newsletter No. 49: Energy Options in the Himalaya
2. Annual Report 2005
3. ICIMOD Brochure, Update February 2006
4. Land-use Transition and Human Health in the Eastern Himalayan Region: An Ecohealth Approach *(Project flyer)*
5. Support for the Conservation of High Altitude Wetlands *(Project flyer)*

Congratulations!

Ms. Prativa Chhetri, Research Assistant with the MAPPA project, ARID Programme, has received the prestigious 'Mahendra Bidya Bhusan' Gold Medal from His Majesty, King Gyanendra Bir Bikram Shah Dev, for securing a first-class-first in her Master's Degree in Sociology. The award was given on the occasion of the '31st National Education Day' held on 24 February at the Narayanhiti Royal Palace. She also received the `Suman Rijal' Gold Medal for academic excellence from Tribhuvan University during the 32nd Convocation Ceremony of the University in November 2005.

Ms. Chhetri did her Master's degree in Sociology at the Patan Multiple Campus of Tribhuvan University while working at ICIMOD. The Directorate and the staff of ICIMOD congratulate her on this special achievement.

Check out our new look website

www.icimod.org

Lots of new features and a new layout. Please send us your feedback and ideas!

New appointments

Dr. Dhrupad Choudhury, Programme Coordinator, ICIMOD/IFAD Technical Assistance Grant Programme/NRM

Dr. Dhrupad Choudhury, an Indian national, joined ICIMOD as Programme Coordinator of the IFAD Technical Assistance Grant Programme effective 15 March 2006. Dr. Choudhury has a Ph.D. in Ecology from the University of Oxford, United Kingdom, where he was an INLAKs scholar. Prior to joining ICIMOD, he was with the G.B. Pant Institute of Himalayan Environment for 10 years, as Scientist In-charge of the North East Unit.

He has worked among ethnic communities in North East India on issues of livelihood security and has special interests in traditional practices in NRM, and access and control regimes to NRM and livelihood. Dr. Choudhury has pioneered work in 'Participatory 3-Dimensional Modelling' in India in the context of 'Perspective Land-use Planning for Managing Shifting Cultivation', an innovative approach pioneered in West Garo Hills, Meghalaya, India, in collaboration with ICIMOD during his tenure with the IFAD Project in NE India.

Dr. Isabelle Anita Providoli, Soil and Water Conservation Specialist/NRM

Dr. Isabelle Providoli, a Swiss national, joined ICIMOD on 27 March 2006 under the APO programme of the Swiss Development Cooperation (SDC). She joined the programme in 2005 and worked for a year in the Swiss NGO Pestalozzi Children's Foundation in Trogen, Switzerland. She also worked in a soil protection centre in Berne and was an intern at the FAO in Rome, Italy, in the coordination unit for the International Year of Mountains (IYM) 2002.

She acquired her Master's degree in Physical Geography and Biology at the University of Berne and her Ph.D. in Environmental Science at the Swiss Federal Institute of Technology (ETH) in Zurich.

Dr. R.B.S. Rawat, Regional Programme Coordinator, MAPPA/ARID

Dr. R.B.S. Rawat is the new Regional Programme Coordinator of the Medicinal and Aromatic Plants Programme for Asia, ICIMOD. He joined MAPPA in February 2006. Dr. Rawat has academic degrees in Physical Science, Forestry, Management, and Medicinal Plants, and brings a wealth of experience in medicinal and aromatic plants (MAPs), in particular, and integrated agriculture, watershed management, and natural resource management in general.

He has a postgraduate Diploma in Management from AIMA, India and specialisations on Rural Development and Planning from Oxford University, UK, and Forest Certification from Sweden and Ecuador. He was a member of the Indian Forest Service (IFS), and was the founding Chief Executive Officer of the National Medicinal Plants Board, India. Before joining ICIMOD, he was the Project Director of a US$90 million World Bank-funded project on Decentralised Watershed Development in Uttaranchal, India. Dr. Rawat speaks several languages including English and Hindi, and a fair knowledge of Nepali, Spanish, Bengali, and Urdu.

Dr. Rita Sharma, Visiting Scientist/WHEM

Dr. Rita Sharma, an Indian national, joined the Water, Hazards, and Environmental Management (WHEM) Programme in February 2006 as a Visiting Scientist. She has a Ph.D. in Ecophysiology and Biochemistry from HNB Garhwal University and a Master's degree in Biochemistry from North Eastern Hill University, India.

Dr. Sharma has more than 15 years of research experience with the G.B Pant Institute of Himalayan Environment and Development, Sikkim, India, and the Centre for Environmental and Agricultural Policy, Research, Extension, and Development, Kathmandu, Nepal. She was also the recipient of research fellowships from the Department of Science and Technology and Council of Scientific and Industrial Research, Government of India. Dr. Sharma has 27 publications in international and national journals, including one co-authored book. Her expertise is in fundamental and applied multidisciplinary ecological research, participatory planning in community development initiatives, and appropriate technological inputs in farming systems development. Her research is applicable to sectors on mountain ecosystem studies, nitrogen fixation, and soil fertility maintenance in upland farming systems; sustainable soil management; and agroforestry systems management, among others.

Mr. Anjesh Tuladhar, Web Assistant, IMCO/IKM

Mr. Anjesh Tuladhar, a Nepali national, joined ICIMOD as a Web Assistant in the Information Management, Communications and Outreach (IMCO)/ Information Knowledge Management (IKM) Programme from May 2006. He will be working on the development of a system for the effective and efficient management of digitised content on the ICIMOD website.

Prior to joining ICIMOD, he worked as a software engineer at Yomari for one and half years, and developed a number of web-based applications. He holds a Bachelor's degree in Electronics and Communication Engineering from the Institute of Engineering, Pulchowk Campus, Lalitpur, Nepal.

Staff Departures

Mr. Krishna Tamang, *Senior Security Guard*
1 December 1984 to 31 December 2005

Mr. Ram Singh Rai, *Security Guard*
1 September 1988 to 31 December 2005

Ms. Mijin Cha, *Consultant,* CEGG
20 September 2005 – 30 April 2006

Ms. Anupa Lamichhane, *Consultant, IMCO/IKM*
16 January 2006 - 17 March 2006

Ms. Srijana Limbu, *Intern*, MENRIS
1 May 2005 – 30 April 2006

Ms. Prajna Regmi, *Intern*, MENRIS
1 May 2005 – 30 April 2006

Mr. Jay Karmacharya, *Intern*, MENRIS
1 May 2005 – 30 April 2006

Associates, Consultants, and Interns

Bajracharya, Sagar, Consultant, MENRIS
Bhattarai, Nirmal K., Consultant, ARID
Dahal, Prabina, Admin Assistant, Personnel
Dhakal, Susmita, Intern, ARID
Ghaffer, Sardar M. Abdul, Intern, ARID
Ghimire, Shobhana, Intern, PPD
Kakati, Niraj, Intern, NRM
Mahat, Tek Jung, Intern, Mountain Forum
Mishra Udayan, Intern, APMN-IKM
Patanjali, Yonzon, Intern, NRM-cum-CEGG
Pradhan, Paribesh, Intern, Mountain Forum
Rai, Numa, Intern, CEGG
Shah, Maqsood, Intern, ARID
Shakya, Nibriti, Intern, Personnel
Shrestha, Gaurav Man, Intern, Personnel
Than, Maung Maung, Associate Scientist, MENRIS
Thapa, Dipti, Intern, NRM
Thapa, Rajesh, Consultant, MENRIS
Turin, Mark, Consultant, CEGG

ICIMOD Staff Members

As of May 2006

Directorate
Campbell, J. Gabriel, Director General
Karki, Madhav Bahadur, Deputy Director General - Programmes
Tuladhar, Milan Raj, Director, Administration & Finance
Technical and support staff: Gurung, Tika Laxmi; Shrestha, Anjeli; Thapa, Prerna

Natural Resource Management (NRM)
Sharma, Eklabya, Programme Manager/Sr. Agricultural Specialist
Bhuchar, Sanjeev Kumar, Assistant Programme Coordinator, PARDYP
Chettri, Nakul, Transboundary & Biodiversity Specialist
Choudhury, Dhrupad, Programme Coordinator, IFAD-ICIMOD Programme
C.N., Anil, Associate Coordinator, IFAD-ICIMOD Programme
Gyamtsho, Pema, Agriculture Resources Policy Specialist
Ismail, Muhammad, Assistant Research Officer-RRP II
Kerkhoff, Elisabeth E., Consultant
Providoli, Isabelle Anita, Soil and Water Conservation Specialist
Sherpa, Samden Lama, Godavari Centre Manager
Shrestha, Ramkumari, Garden Consultant
Sthapit, Keshar Man, Country Coordinator, PARDYP
White, Roger John, Regional Project Coordinator, PARDYP
Yan Zhaoli, Rangelands Specialist
Technical and support staff: Dangol, Bhawani Shankar; Dangol, Pradeep Man; Dhakal, Madhav Prasad ; Ghale, Neetu; Joshi, Sami; Shakya, Bandana; Shakya, Samma; Shrestha, Mamata; Shrestha, Giri Bahadur; Tamang, Jiwan

Agriculture and Rural Income Diversification (ARID)
Banskota, Kamal, Programme Manager/Sr. Env. Resource Economist
Ahmad, Farooq, Project Coordinator, Beekeeping Project
Choudhary, Dyutiman, Consultant/Programme Officer-MAPPA
Gurung, Min Bahadur, Institutional Development Officer, Beekeeping
Hummel, John, Visiting Scientist
Jodha, Narpat Singh, Senior Associate Scientist
Joshi, Surendra Raj, Action Research Officer, Beekeeping
Partap, Uma, Research Officer/Pollination Specialist, Beekeeping
Rawat, R.B.S, Regional Programme Coordinator, MAPPA
Sharma, Bikash, Energy Specialist
van der Blonk, Ester, Eco-tourism Expert
Technical and support staff: Bhandari, Shova; Chhetri, Prativa; Shah, Rajendra; Shukla, Anirudha Nath; Upadhaya, Satananda

Water, Hazards, & Environmental Management (WHEM)
Xu Jianchu, Programme Manager/Ethno-ecologist
Eriksson, Mats, Senior Environment Economist for Water Resources
Sharma, Rita, Visiting Scientist, Environment Management
Shrestha, Mandira, Water Resources Specialist
Technical and support staff: Joshi, Sarita; Khadgi, Vijay Ratan; Shilpakar, Rajendra Lal

Culture, Equity, Gender and Governance (CEGG)
Kollmair, Michael, Programme Manager/Senior Social Scientist
Gupta, Radhika, Coordinator, Equity and Rights
Dasgupta, Joy, Assistant Coordinator, Strengthening ABSBIO-EH
Mehta, Manjari, Associate Scientist
Oli, Krishna Prasad, Regional Coordinator, Strengthening ABSBIO-EH
Subedi, Nani Ram, Coordinator, Decentralisation & Local Governance
Technical and support staff: Shrestha, Govinda

Policy & Partnership Development (PPD)
Farid, Ahmad, Monitoring and Evaluation Officer
Golam, Rasul, Policy Development Specialist
Manandhar, Prem Krishna, Partnership and Planning Officer
Roy, Srabani, Programme and Project Development Specialist
Technical and support staff: Thapa, Samjhana

Information and Knowledge Management (IKM)
Mikolajuk, Zbigniew, Programme Manager/Sr. Knowledge Management Specialist

Information Management, Communications, and Outreach /IKM
Gurung, Nira, Communications Officer
Mendez, Joyce M., Publications Editor
Murray, A. Beatrice, Senior Editor
Pandey, Sushil Raj, ICT Specialist
Technical and support staff: Bajracharya, Shanti Prabha; Jha, Anil; Khatri, Shiva Hari; Maharjan, Dharma; Nepal, Sugam; Pradhan, Punam; Pradhan, Saisab; Sharma, Bishwanath (Sudas); Tandukar, Deependra; Thaku, Asha Kaji; Thapa, Ram Sharan, Tuladhar, Anjesh

Mountain Environment and Natural Resources Information Systems /IKM
Shrestha, Basanta, Division Head/Systems Specialist
Bajracharya, Birendra, GIS Analyst
Bajracharya, Samjwal Ratna, Geomorphologist/GIS Analyst
Mool, Pradeep K., Remote Sensing Analyst
Pradhan, Bidya Banmali, Environment Officer
Pradhan, Sushil Man, GIS Analyst
Thang, Cung Chin, GIS/Natural Resource Specialist
Technical and support staff: Bajracharya, Rajan Man; Bhatta, Mandakini; Dangol, Gauri Shankar; Joshi, Govinda; Moktan, Monica; Rajbhandari, Lokap

Global Mountain Forum Secretariat *(Hosted by ICIMOD)*
Ponce, Ana Maria, Executive Secretary, Mountain Forum
Curi, Celine, Programme Development Officer
Karami, Sani Malam, Information Technologies Officer
Sharma, Prashant Deputy Executive Secretary
Sherchan, Ujol, Programme Officer, Information Services & Content Development
Technical and support staff: Rana, Anju

Administration and Finance

Budget and Finance Section
Mali, Rajendra P., Budget and Finance Officer
Nepal, Akil; Shrestha, Kiran Man; Shrestha, Nabindra Raj; Shrestha, Prabha R.; Shrestha, Pramila
Store Unit: Vaidya, Jenny; Ranjit, Rabindra

Personnel Section
Kansakar, Chandra Bir Singh, Personnel Officer
Amatya, Shree Mani; Bajracharya, Nani Keshari

Communications Unit
Basnyat, Ayushma R L; Sadasankar, Pashupati

Procurement and Equipment Maintenance Section
Khanal, Niranjan, Procurement & Equipment Maintenance Officer
Bajracharya, Narendra; K.C., Sudama

Photocopy Unit: Rana, Ganga; Shrestha, Shyam

Travel and Hospitality Section
Upreti, Rajen, Travel Officer
K.C., Rishi Ram

Motorpool Unit
K.C., Dhurba; Magar, Bishnu; Maharjan, Chinikaji; Maharjan, Krishna; Maharjan, Pancha Narayan; Maharjan, Ram; Maharjan, Ram Lal ; Shrestha, Kishore; Shrestha, Mohan Krishna; Singh, Sabak; Subedi, Jai Bahadur

Security and Maintenance Unit
Jirel, Birkha; K.C., Ram Bahadur; Maharjan, Kishore; Malla, Prem Dhoj; Thapa, Babukaji; Thapa, Shambhu

World Environment Day

5 June 2006

ICIMOD
International Centre for Integrated Mountain Development
Khumaltar, Lalitpur, G.P.O. Box 3226, Kathmandu, Nepal
Telephone: (977 1) 5525313
Fax: (977 1) 5524509, 5536747, Cable ICIMOD, Nepal
email: icimod@icimod.org

www.icimod.org
www.southasianfloods.org
www.mtnforum.org/apmn
www.mountainwomen.net
www.hkh-friend.net
www.icimod-gis.net
www.mtnforum.org
www.pardyp.org