

SUSTAINABLE MOUNTAIN DEVELOPMENT

in the greater Himalayan region

Managing Watersheds in the Himalayan Region



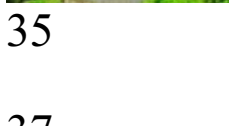

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Ten Years of
People and Resource
Dynamics in Mountain Watersheds

Watershed management hydrological
findings/Water availability concerns

Watershed country assessments:
Bhutan, India, Nepal

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From the Director General's desk...

Dear Friends of ICIMOD,

In June of this year one of ICIMOD's longest running projects came to a close. For the last nine-and-a-half years the 'People and Resource Dynamics in Mountain Watersheds of the Hindu Kush Himalayas' Project (PARDYP), supported by Swiss Development Cooperation and the International Development Research Centre of Canada, has provided a platform for our partners and ourselves to investigate and document processes and management issues in mountain watershed management. This issue is devoted to sharing some of the key findings from PARDYP and examining watershed issues in relation to other similar initiatives in the Himalaya.

Since ICIMOD's inception in 1983, watershed management activities have been central to our work. As an integrative framework, watershed management encompasses water flows, soil erosion, forest and pasture management, water quality, land use systems, and other aspects of mountain farm livelihoods. ICIMOD initially focused more on improving the understanding of physical processes related to soil erosion, hydrology, sedimentation, and soil fertility. This resulted in many internationally acknowledged papers, publications, and books. Over time, however, the importance of the human dimension in watershed management and the role of institutions governing the management of mountain commons were recognised as crucial to the livelihoods of the poor and the sustainable use of upland areas. From 1996 both resource dynamics and human dynamics were investigated together, rather than separately, under PARDYP and associated programmes.



Anupam Bhatia

Director General J. Gabriel Campbell with incoming Chairperson of the ICIMOD Board 2007, H. E. Ghulam Mostafa Jawad, Deputy Minister of Agriculture and Irrigation, Afghanistan.

Currently, watershed management issues are being taken up with high priority by most of the countries in our Himalayan region. Demand for clean and more regulated water flow from mountain catchments is increasing for agricultural, domestic, energy, industrial, and urban uses, even as climate change and use of chemicals increase the rate of variability and pollution. Increased emphasis on biodiversity conservation and the landscape values of watersheds provide additional impetus for better watershed management. Although research in which ICIMOD has also been involved shows that the correlation between forest cover and downstream flooding is much more complicated than previously thought, the importance of the environmental services provided by upstream watersheds is increasing as impacts on the millions living downstream also increase. Improved understanding of these issues and assisting local residents to address them is at the core of ICIMOD's Natural Resource Management Programme – and remains a key challenge for the future.

I would like to thank all the partner institutions that have contributed to this volume. Special thanks go to Roger White, Regional Coordinator of the PARDYP project and coordinator of Watershed Management activities at ICIMOD, and Sanjeev Bhuchar, Assistant Coordinator PARDYP, who served as the thematic editors for this issue. I also thank all the authors who have contributed to this volume. We look forward to your feedback and suggestions on how to serve the mountain people better by contributing to securing their livelihoods and environment.

Sincerely,
J. Gabriel Campbell, Ph.D.

People and Resource Dynamics in Mountain Watersheds

Roger White, Regional Coordinator, PARDYP, ICIMOD, rwhite@icimod.org



PARDYP India

Demonstration of off-season vegetables at a PARDYP site in Bhetagad, Uttarakhand, India

The People and Resource Dynamics in Mountain Watersheds of the Hindu Kush-Himalayas (HKH) Project (PARDYP) was managed by ICIMOD and funded through Swiss Development Cooperation (SDC) and the International Development Research Centre (IDRC) of Canada. The PARDYP Project ran from 1996 until June 2006.

PARDYP evolved from two IDRC-funded initiatives managed by ICIMOD.

1. The three-year 'Soil Fertility and Erosion Project', and four-year 'Mountain Resource Management Project', both of which undertook studies of resource dynamics in the Jhikhu Khola watershed of Nepal from 1989 to 1996.
2. The 'Rehabilitation of Degraded Lands in Mountain Ecosystems' Project' (1992/1996) carried out in China, India, Nepal, and Pakistan, and which involved testing and developing ways of rehabilitating and re-greening small patches of degraded and denuded land on valley slopes in the HKH.

PARDYP carried out research for development in hydrology and meteorology, farming systems, land cover, water availability and management, soil erosion and fertility, on-farm and off-farm conservation and rehabilitation, community forestry, access and rights issues of common pool resources, agronomic and horticultural initiatives, and social, economic, gender and marketing issues.

The main partners were:

- in China, the Kunming Botanical Institute, and the Centre for Biodiversity and Indigenous Knowledge (CBIK);
- in India, G.B. Pant Institute of Himalayan Environment and Development (Almora);

- in Pakistan, Pakistan Forest Institute (Peshawar); and
- in Nepal, the Department of Forests, the Department of Soil Conservation and Watershed Management, Department of Hydrology and Meteorology, and others.

Three international institutions have provided considerable advice, support, and consultancy services to PARDYP from its inception. The University of British Columbia provided inputs focused mainly on Nepal in the fields of soil fertility management and productivity through periodic visits to Nepal by its staff, while the University of Berne provided expert advice on hydrology through periodic visits and the services of a part-time research hydrologist based in Berne. Inputs from the University of Berne covered all five watersheds. From January 2003, the Geography Department of the University of Zurich assisted, particularly with issues related to access to natural resources and by providing broad backstopping in social sciences.

Changing perceptions

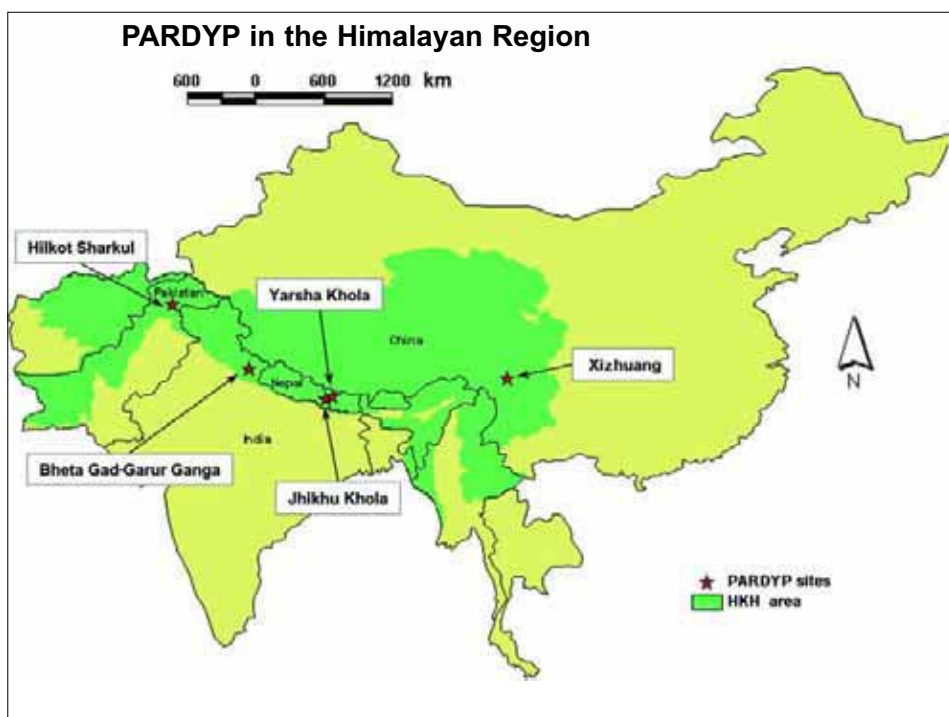
Water scarcity. When research commenced, the problems and issues of middle mountain watersheds were thought to be deforestation, increasing erosion, declining crop yields, and farm incomes. Floods were seen as significant problems for both middle mountain inhabitants and downstream dwellers. However, after nine years of research a different picture emerged, backed by interaction with watershed residents and farmers as well as by exhaustive data collection and analysis. The research carried out is undoubtedly one of the most detailed and geographically widespread environmental research projects undertaken in the Himalayas.

To farmers and non-farming residents in these rural watersheds, water scarcity is a pressing issue; floods are not normally of great concern to the watershed inhabitants. To them, long

walks to springs or lining up at taps are the reality, and this situation is getting worse year by year. This is inconvenient and wastes time, but almost inevitably it is the women and children that collect water and they suffer the most. In addition there are indications that, even in rural areas, water quality is deteriorating and environmental health problems lie ahead. Juerg Merz, in his article on water scarcity (p.16) describes the problems people face in these watersheds.

Deforestation. The massive deforestation identified as a problem at the start of the research is not taking place. In all PARDYP watersheds, tree cover has been maintained at least or is increasing. Why is this? In China, recent devastating downstream floods have been blamed on bad land management in the hills. Consequently, the Government of China embarked on a land conversion policy aimed at reforestation of steeply sloping agricultural land. The government has also launched massive reforestation programmes that are increasing tree cover. Central government interventions are leading to increased tree cover (see Xu Jianchu's paper on p. 22).

In Nepal the impact of the well-documented community forestry approach is clearly visible in the Jhikhu Khola watershed where there are 39 active forest user groups. Central government policies are allowing people to manage their own natural resources. We are seeing big increases in both areas under forest and the quality of forests.



Five PARDYP watershed sites in four ICIMOD member countries: Bhutan, China, India, and Nepal

At our research site in Pakistan, the process is in transition. Forest cover is very low nationally and the topic is widely discussed and debated. Much of the forest in the PARDYP watershed in Hilkot is privately-owned. For many years, forests have been overexploited, either by owners or by surrounding villages. No one was really benefiting and the resource was diminishing. PARDYP has helped to resolve conflicts between the landlords who own the bulk of the forests and the villagers who get their timber and firewood from them. By recognising each other's use patterns, there are signs that forest cover is improving.

The tree cover in the PARDYP watershed in India was 56%, but much of this was reserve forest of *Pinus*

There are tried, tested, and proven technologies and management practices that can help the farmers, but many of these ideas are not reaching poor farmers.

roxberghii, of poor quality, and of little use to the local people.

Soil erosion. Extensive soil erosion was considered to be a significant problem. This is a widely-held perception and quite believable given the steep slopes and fragile nature of the middle mountains. Our results showed that degraded land did, as expected, have high rates of soil erosion if the soil particles were detachable. However, the agricultural land and, in particular, rainfed 'bari' lands showed unexpectedly low rates of erosion in all the research watersheds. In Pakistan, where rainfall

is distributed more evenly throughout the year, and therefore vegetative cover is maintained, annual erosion rates were rarely above one ton per hectare per year. Of far greater importance is nutrient management, leaching of nutrients through the soil profile. Farmers can potentially save money by timely application of mineral fertilisers.

Hydrometeorology. One of the core activities – and accounting for 60% of our budget – was a detailed hydrometeorological network in each of the five research watersheds. This work proceeded well with solid backstopping from the University of Berne. However, our conclusions are that, in order to get a clear picture of rainfall at 95 confidence limits, the minimum period required for data collection would be 27 years. While the data have helped us understand several processes, such as runoff generation, rainfall intensity, and flood generation, our data could not be used to analyse climate change.

Logistics involved in carrying out research. While extraordinary technological advances have taken place in the last nine years, the realities in our study areas and with partners do not bear this out. Many of our partners still do not have good Internet and email connectivity and, in 2006, some transactions have had to take place by post and a letter often takes six weeks to arrive! Some of our partners have not been able to open files or intranet sites – technologies at our disposal at ICIMOD in Kathmandu that we often take for granted. Similarly, we are all aware of the great advances in satellite imagery and remote sensing, but the reality has been that, in two of our four partner countries, we have been unable to get air photography or satellite imagery for security reasons.

Improving livelihoods as the vehicle for reducing land degradation

PARDYP has not only documented problems and issues, it has also tried to come up with ways of overcoming the problems. Solutions are being developed and a great deal can be done to promote successes in one geographical area to other mountain areas.

Water scarcity can be mitigated to some extent by improving the efficiency of water use. For example, low cost drip irrigation sets produced and promoted in Nepal by the International Development Enterprises are really liked by farmers in areas where water scarcity



Keshar Man Shapit

Adoption of fish ponds in the PARDYP India watershed site



PARDYP Nepal

Water discharge measurement in the Jhikhu Khola watershed in Nepal

in the dry season can reduce home garden or vegetable production. With PARDYP assistance, farmers in China and Bhutan have been given drip sets to test. In addition, water scarcity can be addressed by improving water harvesting methods.

As a research network, PARDYP has been criticised for not coming up with new ideas. Recent reviewers said we promote solutions that are already well known. This may be true but, in the absence of an effective extension service, farmers are just not aware of many cheap and

simple solutions. The reality on the ground is that provision of good seeds, timely and appropriate application of fertiliser, and community management of natural resources can transform rural livelihoods. Another important finding of PARDYP is that the transfer of knowledge among countries in the mountains and between communities and 'experts' is still not taking place effectively. Sharing knowledge and demonstrating best practices can make a tremendous difference to people's livelihoods and to the sustainable management of natural resources in the Hindu Kush-Himalayas.

What our watershed management research has led us to conclude

1. There are good ideas – tried, tested and proven technologies and management practices that can help farmers to manage their land in a sustainable way. However, many of these ideas are still not reaching farmers, especially poor farmers.
2. Demonstrations of these options – beacons of innovation – with farmers in a watershed setting can help adoption, but extension staff involved in scaling up need to establish credibility and trust with the farmers if we are to see widespread adoption.
3. Working with farmers to develop their ideas for improved management of natural resources can be both rewarding and achieve good results.
4. Natural systems appear more resilient to changes in land use and farming practices than we think, but there may be a strong 'buffering' effect, where we do not see gradual change but rather crashes (for example in N levels in water and soil acidity).
5. In these research watersheds over the last 10 years, watershed health has at least been maintained or improved significantly in terms of an increasing or maintenance of tree cover.
6. Soil erosion rates from agricultural land are much lower than was originally thought, although contributions from degraded land may be high. To reduce soil erosion, it is better to tackle the degraded land not the agricultural land.
7. Hydrological issues are more about low flows and how to improve water management rather than about floods and how to reduce peak flows.
8. New, unforeseen problems may arise – like different and changing nutrient deficiencies in increasingly intensively used soils.

Land Rehabilitation in the Himalayas

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PARDYP India

Sustainability of rehabilitation work depends to a large extent on women's participation in decision-making

The commons of the Himalayas are critical support lands for the majority of the rural population. In many areas, lands have degraded rapidly in recent decades because of population density, unsustainable land-use practices, and other complex, underlying socioeconomic and political factors. Their rehabilitation is not only important but also challenging for mountain societies and governments in the region and associated downstream communities. Fortunately, new policies and programmes in the region have provided bases for optimism.

Land rehabilitation activities under ICIMOD's project on 'Rehabilitation of Degraded Lands in Mountain Ecosystems' (1992-1996) followed by the 'People and Resource Dynamics' Project – PARDYP (1996-2006) were launched in response to the above concerns.

One of the focuses of these action-oriented projects involved systematically identifying and documenting land degradation problems and choosing management alternatives through field case studies. The activities were implemented with local communities in project areas in China, India, Nepal, and Pakistan with professionals working on eco-rehabilitation in the ICIMOD regional member countries (RMCs) and

outside. The ultimate goal of these projects was to improve and secure people's livelihoods through sustainable management of natural resources.

Approach and methodology

The approach to rehabilitation of degraded lands was designed around basic facts in the context of Himalayan environmental degradation.

- The dynamics of human activities influencing land use in mountain areas are a result of population growth, changing farming practices, and market-driven forces.
- Land ownership and resource use patterns are critical for elaborating and defining rehabilitation

strategies. The inter-linkage of three types of land ownership (private, community, and public) at village level should be considered.

- In order to achieve long-term environmental benefits and goals, short-term economic benefits to local villages must be prioritised.
- Community participation and promoting community user group institutions with support from local government are keys to success.
- Ecosystem rehabilitation and management are dynamic processes and should be monitored continuously.

Methodologies included baseline surveys and Participatory Rural Appraisal (PRA) to identify biophysical and socioeconomic conditions along with land degradation on the project sites, participatory biomass development and soil and water management, and incorporation of indigenous knowledge and locally-used species. Environmental monitoring and evaluation were given priority.

Achievements

The efforts and results, in both participatory management and research activities, were successful and positive. The activities designed for each of the sites were determined through a participatory approach in consultation with local institutions and communities. The highlights of the major accomplishments are as follows.

Institutional collaboration. Institutional collaboration and local arrangements for rehabilitating degraded lands in four Himalayan countries were strengthened. In China, three institutions of the Chinese Academy of Sciences, four local governments in Baoshan district, and 136 households collaborated in the programmes.

In India, villages in the community forestry panchayat of Arah and Khaderiya (Bageshwar, Uttarakhand) gave proposals for programme implementation, and the G.B. Pant Institute of Himalayan Environment and Development introduced these programmes. About 140 households were involved.

In Nepal, community forest user groups in Bajrepani, Dhairani, and Mandelidevi, and Ekanta Basti Youth Club in Dhotra, all in Kabhrepalanchowk District, participated in the programme.

In Pakistan, the Pakistan Forest Institute established collaboration with Mangla Village and Hilkot watershed in Mansehra District.

Capacity-building and people's participation. Interdisciplinary teams from different institutions in the

four countries examined resource constraints and management options with land users. Scientists with technical and social backgrounds worked together with local experts and communities to develop sites and engage in research activities. The central focus of the rehabilitation work was people's participation. Social fencing and stall feeding were carried out, and these measures not only contributed to the protection of newly-planted areas but also to the natural regeneration processes of vegetation.

Baseline information. Baseline information was generated as a means of understanding key environmental processes leading to land degradation in the middle mountains of the HKH. The common concerns identified included degeneration of traditional arrangements for management of the commons, increasing water deficiencies during dry seasons, declining soil fertility, excessive use of resources and overgrazing, and shortage of fodder and fuelwood supplies from local sources.

Biomass development on sites. Rehabilitation techniques, such as contour-line planting on slopes, hedgerow planting, the use of nitrogen-fixing, native pioneer and exotic species as facilitators, and soil and water management, had a positive effect on restoration and biomass development. Plant nursery establishments enhanced local biodiversity and assured the community of a constant supply of seedlings for the rehabilitation of degraded lands.

Erosion control and water harvesting. Construction of low-cost checkdams in gullies, e.g., stone checkdams, earth-fill dams, and planting grasses and shrubs in gullies and on channel banks all had a positive impact on soil and water erosion in the site areas.

Scarcity of water was found to be a causative factor of land degradation. Thus, different kinds of cost-effective water harvesting and water-use efficiency technologies were introduced. The stored water was sufficient to meet short-term needs.

Monitoring systems. An on-site monitoring network was established on all sites to document environmental processes. Monitoring included hydrology, soil erosion, soil fertility changes, performance of introduced plant species, rate of biomass coverage, and changes in socioeconomic conditions. Some of the results are presented in the figure.

On-site training and education. On-site training and education were part of the research programmes. Land users and community user groups were trained in nursery work, sloping agricultural land technology



PARDYP Nepal

A rehabilitated area in a PARDYP Nepal watershed site

(SALT), water-harvesting technologies, gully management and control, and plant maintenance and management systems. College students and graduates were trained on-site as part of their studies. Village school and community environmental awareness education were carried out, and large numbers of people from rural communities visited the sites.

Conclusions and recommendation

ICIMOD's regional collaborative programmes on land rehabilitation mobilised the professional communities in the region to address the problems of land degradation through in-depth scientific assessment. The programmes focused on various aspects such as the development of a database on

changes in land use, soil fertility, and socioeconomic dimensions of mountain development on micro and meso scales; identification of appropriate biomass and bioengineering technologies for restoring degraded lands; regional sharing of information and experience; and, most importantly, the role of community organisations in rehabilitating degraded lands.

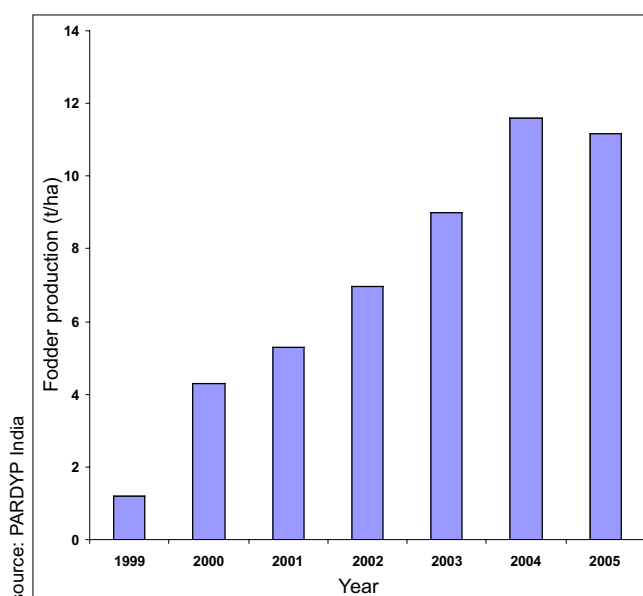
The projects found that land rehabilitation requires much more effort than simply introducing technical measures. Encouraging the participation of land users, especially women, so that the measures are maintained are far more important than establishing trees. The project's experience also shows that all efforts related to rehabilitation of degraded land in the Himalayas require a multi-disciplinary approach and a sustainable network and partnership among different stakeholders.

Finally, the lessons from these projects and others in the Himalayas suggest that land rehabilitation activities have many benefits and must continue. This, however, requires political facilitation so that all efforts related to rehabilitation of degraded lands become an integral part of regional and national initiatives on natural resource management.

Further reading

Bhuchar, S.K., Shah, P. B., White, R. (2005) 'Potential Strategies for Rehabilitating Degraded Lands in the Middle Mountains of the Hindu Kush-Himalayas'. In White, R. and Bhuchar, S.K. (eds), *Resource Constraints and Management Options in Mountain Watersheds of the Himalayas: Proceedings of a Regional Workshop held 8-9 December 2003 in Kathmandu, Nepal*.

ICIMOD (1996) 'Rehabilitation of Degraded Lands in Mountain Ecosystems in the Hindu Kush-Himalayan Region (January 17, 1992–December 31, 1995)'. Final report submitted to the International Development Research Centre



source: PARDYP India

Changes in fodder production at the Khaderiya rehabilitation site in the PARDYP India watershed

Watershed Management Hydrological Findings:

Collaboration between PARDYP and the University of Berne, Switzerland

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PARDYP Nepal

Water shortage for domestic purposes is a pressing problem in PARDYP catchments

The Geographical Institute of the University of Berne (UoB) has been involved in projects in the Himalayas for several decades. This work resulted in key publications such as *The Himalayan Dilemma: Reconciling Development and Conservation* by Ives and Messerli (1989) and *Himalayan Environment: Pressure, Problems, Processes - 12 Years of Research* by Messerli et al. (1993).

This experience led to the Institute's Hydrology Group being assigned a backstopping role (choice of test areas, supply and installation of measuring instruments, training and monitoring scientific personnel) in PARDYP in 1996. Selected research contributions of the UoB are described briefly in this article.

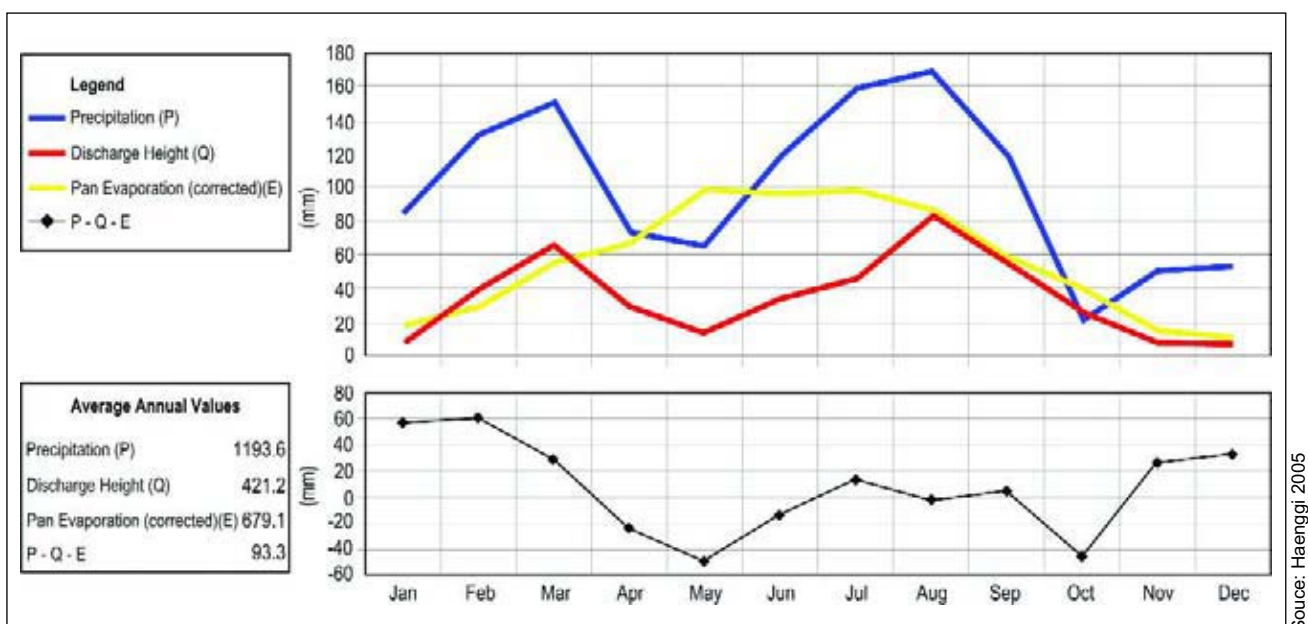
Planning the measuring network

In order to achieve the interdisciplinary aims of PARDYP new test areas were set up in Nepal, India, Pakistan, and China (Weingartner and Hofer 1996). They were modelled on the Yarsha Khola sample test area in Nepal and the same instruments were installed in the new areas (Doppmann 1996). A summary of this

first phase can be found in Hofer (1998) 'Hydrometeorological Measurements and Analysis in Interdisciplinary Watershed Projects'.

Geomorphological investigations, Yarsha Khola

Two important questions during the first phase concerned flood discharge and soil erosion. The work carried out by Tschanz (2002) focused on mapping the activity and intensity of geomorphological processes (fluvial processes, movement of masses, surface processes) in Yarsha Khola. Information on the impact of these processes was collected and possible preventative measures were devised. Tschanz observed that around three-quarters of the surface of the test



Source: Haenggi 2005

Monthly water balances (2000–2004)

area could be considered unstable from a geomorphological point of view.

Voegeli (2002) looked at micro-scale erosion processes on steep and intensively-cultivated rainfed terraces ('bari') in Jhikhu Khola catchment. Surface degradation was determined in 18 test zones of 1 m². The results indicated highly dynamic soil erosion: 60–90% of the total soil degradation occurred during the one or two heaviest rainstorms.

It was possible to show that vegetation cover was a key factor in relation to soil degradation: if a second crop is planted before the start of the monsoon, soil degradation is reduced considerably.

Hydrometeorological analysis of Hilkot catchment, Pakistan

In Pakistan, Haenggi (2005) carried out a comprehensive analysis of the hydrometeorological data of Hilkot watershed. Snowfall, remaining snow cover, and ablation were also examined to obtain a spatially and temporally high-resolution water balance. Haenggi developed a simple model based on temperature and precipitation. Direct measurements (class A-pan) and indirect values (after Penman and Haude) were used to determine evaporation. Using hydraulic calculations (Strickler-Manning) new values were added to the gauge height-discharge ratio. Special attention was given to analysing the low precipitation and low water conditions in Hilkot watershed.

The particular characteristic of Haenggi's study is that all calculations in the digital version (estimated

snowfall, actual evaporation, hydraulic calculation of the P-Q ratio, analysis of low precipitation) can be reproduced, enabling similar analyses to be carried out in other catchments.

Assessing and improving the quality of drinking water in Jhikhu Khola watershed, Nepal

During the PARDYP project, the focus shifted from floods and erosion to resources, an issue which was seen from the intermediate results obtained to be far more urgent.

Schaffner (2002) examined the quality of drinking water in the Jhikhu Khola catchment to find ways of improving the situation. The results obtained underlined the enormous problems of microbiological quality of the water: *E.coli* was found in all the water collection systems examined (public water sources, wells, rainwater harvesting jars) during the dry season and monsoon, the highest concentrations being observed just before the onset of the monsoon. According to WHO guidelines, the health risk in many water collectors is high to extremely high. Schaffner showed that using the WHO sanitary inspection method (checklist), a detailed picture of water quality in a collector can be obtained without carrying out complicated and expensive tests.

Water balance, floods, and transport of sediments in the Hindu Kush-Himalayas

Merz's thesis (2003) provides a detailed quantitative and representative insight into water

problems in the Hindu Kush-Himalayas. As far as water is concerned, this study can be seen as a summary report for PARDYP. The first two chapters provide an excellent overview of the region and the areas used for PARDYP'S investigations, including information about the availability of water, flood risks, and soil degradation. The hydrological data are analysed, compared, and interpreted (e.g., precipitation, evaporation, discharge, mobilisation, and sediment transport) in Chapter 3. River bank erosion turned out to be a more important source of sediment than was previously thought. Using three hydrological models (UBC, Tank, PREVAH) Merz reports on the hydrological impact of possible future scenarios in Chapter 4. Due to problems encountered in choosing parameters for the models (too little high resolution climatic data, lack of data on vegetation), Merz could only make generalised predictions about possible developments. The various model runs indicate that discharge during the dry season is likely to decrease while floods during the monsoon will probably become more frequent. The summary includes indices (water poverty index [WPI], flood generation index [FGI], water-induced degradation index [WDI]) for the different PARDYP test areas, either further developed or newly devised by Merz) and these are also compared. The last chapter

Priority	Hilkot	Bhetagad	Jhikhu	Yarsha	Xizhuang
1	Water shortage for irrigation	Depletion of water resources	Irrigation water shortage	Irrigation water shortage	Water shortage during dry season
2	Water management	Inappropriate management of water resources	Drinking water shortage	Drinking water shortage	Too much water during wet season
3	Poor water quality and quantity for drinking	Solid and nutrient losses	Deteriorating water quality		Drinking water shortage
4			Water pollution	Top soil loss and nutrient build-up	

Source: Merz (2003)

Key water-related issues (catchment scale), PARDYP

provides answers to three essential questions about water.

1. *Is there a water shortage today in Jhikhu Khola and/or Yarsha Khola?*

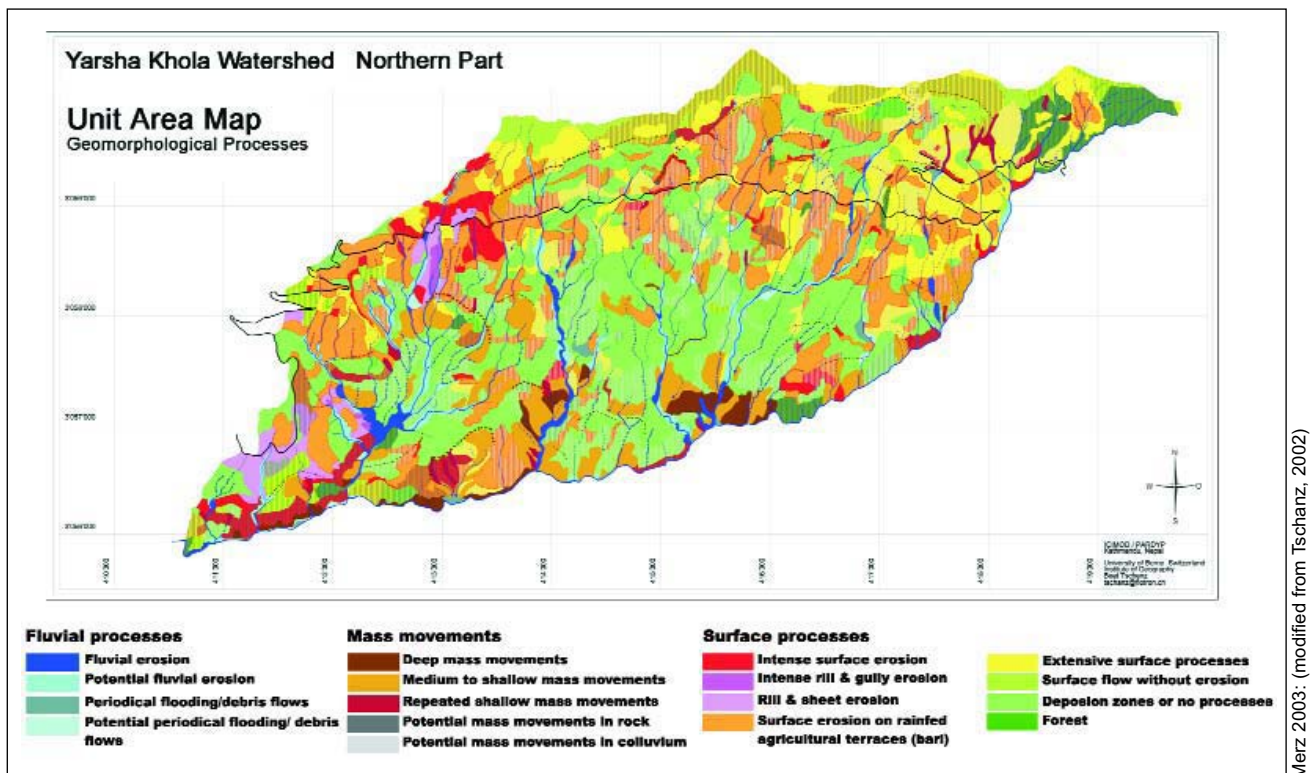
Analyses show that there is sufficient water if resources are used economically. Optimum water management requires introduction of additional irrigation methods for the dry season (drip irrigation) and efficient water harvesting.

2. *Do agricultural activities in the upper areas of the catchment accentuate and accelerate the build-up*



PARDYP Nepal

Water-related issues become a major concern in middle mountains, here the Daphne Khola, Kabhre District (Nepal)



Geomorphological processes on the south-facing slope of the Yarsha Khola catchment

of flood water and does this lead to a more critical situation in the lower areas?

From a hydrological perspective, the way the land is cultivated at present (wet fields, terracing) is good because it reduces medium and minor floods. The impact of cultivation is less important in relation to massive floods because of the intensity and/or volume of precipitation. Water management is extremely important in relation to this issue.

3. *Is loss of soil through erosion a major problem?*

From the results of the study, soil erosion appears to be only a minor problem. The high sediment loads observed in the receiving water are not due to widespread erosion. The main sources of sediment are river-bank erosion, poor road construction, and degraded surfaces, although the latter represent only a small part of the total area. Good management can reduce the sediment load, including protection of river banks, appropriate road construction, and reconstruction of degraded areas.

Overall, it would appear the way the land is used at present helps stabilise the hydrological system in the area. A decisive factor for future development will be whether an efficient management system is established at various levels.

Publications in international journals

Numerous articles have been published in scientific journals in recent years as a result of close collaboration between the UoB and PARDYP. In this context, three papers presenting the results of the water and supply surveys which have been conducted in some of the PARDYP catchments (Merz et al. 2003a, 2003b, 2004) have documented the significance of socioeconomic aspects within hydrological investigations. These publications have been trend-setting for the hydrological activities in the following years.

The two most recent articles published in international journals are described below.

Road construction impacts on stream suspended sediment loads

In this report, Merz et al. (2006a) describe the considerable impact of road construction on sediment loads. In the case studied, the annual volume of sediment rose by 300-500% despite measures taken along the new road to reduce erosion. This rise, it can be assumed, is far higher in the case of road construction projects where no such measures are taken.

Overall, it would appear the way the land is used at present helps stabilise the hydrological system in the area.

Rainfall amount and intensity in a rural catchment

In the *Journal of Hydrological Sciences*, vol. 51 (2006b) Merz et al. present the results of precipitation measurements in the Jhikhu Khola watershed using intensity-duration-frequency curves with various return periods. The heaviest rainfall, which occurs immediately before and at the start of the monsoon, can reach an intensity of 79.2 mm/h over 30 minutes (return period 20 years).

Reflections

For the University of Berne, collaboration with PARDYP was fruitful and successful from various perspectives. Many studies were carried out by students to the advantage of both parties. The concept of back-stopping should be applied in future projects, in the interests of local institutions. From the perspective of the external institution, better integration with ICIMOD is desirable and would bring about a win-win situation. One problem encountered was that certain projects partners were unwilling to exchange scientific data. An interdisciplinary project such as PARDYP is after all based on communication and open data management, which is the only way to ensure that all parties involved gain the maximum benefits possible.

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Concerns about Water Availability in PARDYP Catchments

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PARDYP Nepal

Shortage of irrigation water is an issue in all PARDYP catchments

Adequate water resources for future generations are a great concern globally. The World Water Vision states that the global demand for water has increased six-fold in the past century and about half of the available freshwater is directly used for human purposes. More than a third of the global population lives in countries under severe water stress: Pakistan and Afghanistan in particular are of concern in the greater Himalaya region, as they have already exploited most of their available water resources.

In 1995 water availability in South Asia was considered catastrophically low, indicating a further decreasing trend by 2025. This global view has a local dimension. PARDYP identified water availability as the main concern for residents in the middle mountains. Water for irrigation is in short supply, followed by drinking water shortage. Water pollution is becoming a concern in some catchments. Other studies by different authors in the greater Himalaya give a similar picture. In Changar, Himachal Pradesh, part of the Indian Western Himalayas, there is acute scarcity of water for drinking and irrigation. Access to drinking water was identified as a major problem in the Central Himalayan region. In the

Sikkim Himalayas drying up of springs and drinking water scarcity are placing considerable stress on the local population. In the Kumaon Himalayas, water scarcity is attributed to the drying up and decreasing yields of springs. Hill towns in Darjeeling and Shillong, the wettest corner of the Indian sub-continent, face water scarcity all year round. Local groundwater resources are drying up because of changes in local land-use patterns. Due to these changes, women and children are forced to walk longer distances to collect water. In the middle mountains of Nepal, it is reported that men find it difficult to find brides because of the drudgery caused by water supply shortages in certain areas.

While the people of the Himalayas have learned to cope with seasonality in the past, new pressures from decreasing water supplies may threaten the livelihoods, particularly of poor and disadvantaged people. The root causes of this crisis are due to both human as well as other natural factors. On the basis of lessons learned from five PARDYP catchments, suggestions for addressing these problems are given below.

Key issues related to water scarcity

Irrigation

Shortage of water for irrigation is a problem in all five PARDYP catchments, in terms of both local perceptions and according to the results of project research. The seasonality of rainfall and rainfall variability during critical months are major constraints. Whereas during monsoon there is no immediate constraint, during the dry season, particularly the months prior to the onset of the monsoon farmers face hardship. Mismanagement is another key reason for water shortages. When irrigation channels are used conflicts among different users often hamper equitable and timely water sharing. Maintenance of the systems is the ultimate hurdle and proper management structures need to be in place to ensure that maintenance is carried out in a timely and proper manner. The infrastructure built years ago is often not adequate for current demands and needs upgrading.

Recommendations

In all PARDYP catchments trials with water harvesting were conducted and showed promising results. However, none of the catchments' farmers adopted the methods tested without some contribution from the project. In addition to improving the water supply, alternative irrigation methods were demonstrated to reduce water demand for both off-season cash crops and staple crops, and these included drip irrigation and sprinklers. Lining of parts or the entire canal was suggested as well as strengthening water users' associations and farmers' groups.

Drinking water

Water shortage for domestic purposes is a pressing problem in all catchments. The situation is aggravated during the dry season towards the onset of the monsoon in June/July. Conflicts were also observed between castes in the case of the Indian catchment or among villages sharing the same water source in the case of the Chinese catchment.

Increasing population is the main factor reducing drinking water supplies as well as 'development', such as the introduction of flush toilets. Increased water demand must come from an already overstretched domestic water supply.

Recommendations

All teams stress the importance of community involvement rather than government action to improve domestic water supply. This involvement starts in the planning phase of a water supply scheme, needs strengthening and contributions from the community during the construction phase, and is absolutely necessary during the management phase.

On the technical side, water harvesting, rainwater harvesting in particular, was mentioned in most of the catchments. In addition to providing limited water

All teams stress the importance of community involvement rather than government action to improve domestic water supply.

supply during the dry season, it can be used during the monsoon to avoid difficult and dangerous trips to the springs.

Increased water supply seems to be the most promising direction, while improved water quality would also show a beneficial impact. It is, however, not possible to reduce the demand for domestic use, which is already lower than the proposed human right to water according to Gleick (1996).

Water quality

In only two of the five catchments was drinking water quality mentioned as a key issue. In the Yarsha Khola catchment, water quality was considered to be a problem for people living in larger settlements as well as during the monsoon when turbidity increased in the water sources. In the Hilkot catchment water quality is sometimes poor, mainly in the water supply system for the main village of Hilkot.

In the Bhetagad catchment, spring water is generally unsuitable for drinking due to microbiological contamination and increased levels of nitrate in springs close to agricultural land. The main reasons for this are considered to be high doses of fertiliser, particularly urea, in tea gardens and inadequate sanitation infrastructure.

Water quality improvement should be tackled in the short term with immediate measures to treat water being used. Creating awareness focusing on water handling is a potential intermediate remedy in two catchments.

In the Jhikhu Khola catchment, microbiological contamination is a major issue with hardly any water source used by people, be it spring box, natural spring, tap or dug well, above the guideline values of the World Health Organisation. Poor sanitary conditions leading to faecal coliform contamination is the main source of water contamination.

Another concern is high values of nitrate and phosphate in many groundwater sources: the origin of these contaminants being the intensive agriculture practised in the valley. Mineral fertiliser is being applied at many times the recommended rates, particularly on important cash crop such as potatoes.

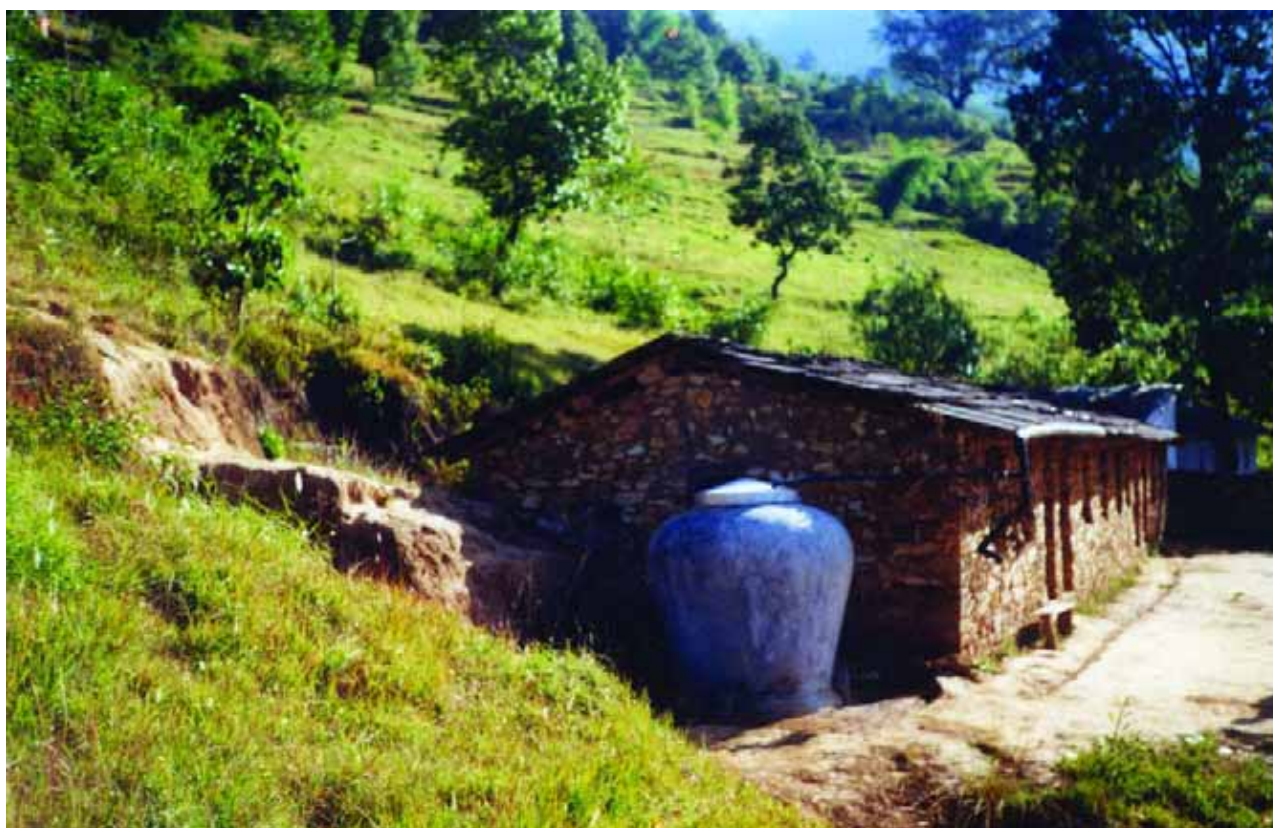
Recommendations

Water quality was only a key issue in two PARDYP catchments - the Bhetagad catchment in India and

the Jhikhu Khola catchment in Nepal. There are, however, water quality hot spots in other catchments. Water quality improvement should be tackled in the short term with immediate measures to treat water being used.

Creation of awareness, focusing on water handling, was stressed as a potential intermediate remedy in both catchments, as well as people's role in water contamination, effects of water contamination on the human body, and various, inexpensive ways of contamination control.

The importance of water source management was also stressed with reference to improved rules and regulations about water handling, extraction, and tap stand use.



PARDYP Nepal

Rainwater harvesting using ferro-cement jars in a PARDYP Nepal watershed

Rehabilitating Common Property Resources: Experiences from PARDYP

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Sanjeev Bhuchar

Rehabilitation of common property resources, as has been done in Begnas village, Kaski District, Nepal, requires an integrated and holistic approach

In the Hindu Kush-Himalayan region, common property resources provide water, fodder, fuelwood, timber, medicinal plants, fruits, nuts, and so on – all of which are essential for sustaining rural livelihoods. Common property resources (CPRs) play a pivotal role in sustaining the productivity of mountain farming systems. Many of these vital resources have undergone degradation because of human-induced and other natural factors – some have reached a point of extreme degradation and substantial investment and motivation are needed to revive them.

Degradation of the commons is known to have many adverse effects: it undermines the hydrological functions of watersheds, thus affecting environmental benefits for upstream and downstream communities and eventually increasing economic, social, and environmental vulnerability among smallholder farmers and poor households. It is important, for vulnerable mountain communities especially, to ensure the sustainable management of mountain commons.

PARDYP studies

One of PARDYP's objectives was to understand the processes of natural resource degradation in the middle mountains of the Himalayas. Initial baseline surveys of watersheds helped to understand major socioeconomic and biophysical constraints to sustainable crop production and improved livelihoods, thus providing an opportunity to explore sustainable use of natural resources, including use of CPRs.

Causes of degradation

(Based on lessons from PARDYP)

- Increase in pressure on natural resources due to increasing population
- Scarcity of good policies
- Poor implementation of good policies
- Degeneration of traditional institutions
- Prevalence of self-interest over collective action
- Inequity in sharing resources leading to conflicts
- Lack of motivation and skills
- Missing technical know-how

PARDYP examples include rehabilitation of degraded community forests in Nepal and degraded village common lands that were developed into fodder banks in India. PARDYP also assisted local communities in developing water management options: water scarcity in the dry season being another problem in the middle mountains where demand is exceeding supply. In all cases, understanding the 'people dimension' was of far greater importance than the technical solutions. We realised that, if communities are made aware of the possibilities and given the confidence to develop their ideas, they can improve and manage resources effectively.



Sanjeev Bhuchar

Any common property related initiative must focus on reducing women's workload

Two examples from PARDYP are given below.

Mandalidevi Community Forest in Nepal

Mandalidevi community forest, Jhikhu Khola watershed, is situated on a relatively dry south-facing aspect and 110 households depend on it. Three years ago the forest was degraded and the villagers did not benefit much from it. Some families used it for grazing and quarrying. Lack of interest on the part of the forest user group had encouraged unsustainable harvesting of resources by some members, and its degradation over time. Most villagers, however, thought that the site should be rehabilitated and managed properly.

PARDYP helped the forest user group to rehabilitate the forest by motivating the local leadership and providing 'missing' technical know-how. The project involved a local NGO and facilitated the user group in preparing and implementing an action plan to rehabilitate the community forest. The members imposed a complete ban on grazing and any other free-riding activities inside the site and were able to stop mining activities above the forest site with the support of the local administration. Species planted in the Mandalidevi forest are growing well. The villagers, particularly the women, are protecting these species, most of which are multipurpose and aid soil and water conservation.

Land and water resources in Doba, India

Doba is a remote village in the PARDYP India watershed. It has few amenities, and the villagers depend heavily on common forest and water resources to meet their daily needs for energy and water. Due to individual self-interest overriding collective interest, and unsustainable use of resources, a common drinking water source and a patch of forest above it were reduced to open access resources and were highly degraded. Introduction of a government piped water supply rendered the spring obsolete. However, the government was unable to maintain the new piped water supply and it fell into disrepair. The spring too had been neglected and the traditional village mechanisms for maintaining the water supply had ceased.

The families depending on these resources were brought together by PARDYP to undertake rehabilitation work. Together with the Doba Gram Sabha (elected body) and PARDYP, they successfully rehabilitated the degraded resources. A village committee was formed to coordinate the maintenance of resources. The spring now provides an uninterrupted flow of clean drinking water to 20 households, and the

rehabilitated land is a source of quality fodder for many. Girls and women are pleased by this initiative as they have easier and greater access to water and fodder.

Success factors

PARDYP's experience shows that the following are among the factors that govern sustainable development of common resources.

Community empowerment. Sustainability of rehabilitation work depends on the extent to which the local people have been empowered, both socially and technically. Organising village campaigns to raise awareness about the benefits of common property resources and explaining the complementarities between CPRs and private resources, applying people-led research and development approaches, motivating village leadership and institutions, reviving traditional institutions, and incorporating traditional knowledge and experience are ways in which communities can be better educated and empowered. In all aspects of a development programme, marginalised families and women must be actively involved.

CPR-PPR complementarities. Farmers in the PARDYP watersheds participated in conservation and protection of CPRs because of the contributions of CPRs to private resource-based, improved options. Providing poor farmers with alternatives that raise the productivity of private property resources is very important. PARDYP recommended options that made a difference to on-farm production, viz. treatment of crops and soils with appropriate strains of microorganisms (biofertilisers), use of improved seeds, cultivation of good quality forage species, cultivating irrigated rice using a system of rice intensification (SRI) method, water harvesting combined with fish farming, off-season vegetable cultivation, improved composting, drip irrigation, and land stabilisation and gully plugging. For all these, conservation and protection of the commons to maintain soil fertility and water availability, control sediment transport in streams and irrigation channels, and reduce workloads of women and men in fetching water and fuel were important achievements.

Monitoring and evaluation. Monitoring and evaluation add value to the design and implementation of programmes. Therefore, communities must try to measure and assess the impact of interventions in an integrated manner by considering social, economic, biophysical, and environment aspects. To arrive at a fair assessment, all stakeholders – rich and poor families,



PARDYP Nepal

Participation of local communities in common property resources management in Jhikhu Khola

men and women, land users, and experts – should participate in monitoring and evaluation activities.

Knowledge sharing and networking. In rehabilitation programmes, dissemination of the findings is a crucial component, and this requires careful planning based on target groups. In PARDYP, action research with farmers, farmer-farmer exchange visits, and farmer days were found to be good methods of sharing knowledge with local people. ICIMOD also demonstrated the use of alternative media, e.g., puppet shows, as an effective way of spreading success stories in remote villages. For others, a communication and outreach strategy may include options such as newsletters (including e-newsletters), CDs, films, websites, extranets, and papers.

Establishing credibility. Building links and trust with land users and decision-makers is the cornerstone of any action research and development initiative. Project staff and extension workers must spend time with the communities and should be able to understand and value the local context. Decision-makers also have a crucial role to play in upscaling a proven good practice, and they should be invited to participate in relevant networking and knowledge-sharing activities.

A Watershed Approach to Securing Resilient Livelihoods and Ecosystem Services

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Xu Jianchu

A woman washing vegetables by a mountain stream in Tingri County, Tibet Autonomous Region, China: human health is linked to the state of the ecosystem in which people live

Water scarcity and ecological security are emerging as major development challenges. Geographically defined, watersheds are a framework for examining ecological, economic, and political issues between lowland and upland, upstream and downstream.

Watersheds as a political discourse

Discussions about ecological, technological, and managerial mechanisms for realising and distributing the benefits of watershed services have caught the attention of local, national, and international circles. Concomitant with these discussions has been the appearance of new social actors such as progressive NGOs and environmentalists, on the one hand, and local communities and rights-based social movements on the other. Although a 'watershed' is a biophysical feature, it must be seen also as a political construct which fosters a complex network of actors – from policy-makers, resource managers and NGOs to

scientists, prospectors, and local communities. This network is composed of diverse and diverging political-economic perspectives and political stakes.

Mountain watersheds are important sources of water, energy, and biological diversity. Furthermore, they may be sources of key resources such as minerals, forests, and agricultural products and be places for recreation. People in these upper watersheds are often blamed for accelerating soil erosion, floods, landslides, and loss of forest cover and biodiversity through the way they manage their natural resources. Discordant visions and unequal relationships between the uplands and the lowlands are

increasing through simplification of forest-water relationships and upland-lowland interactions by the public and policy-makers. Watershed management calls for a better understanding of people and resource dynamics. This requires moving beyond popular 'myths' – such as those stating that deforestation leads to reduced water availability and to increased soil erosion. Such myths are simplifications of cause-consequence relationships that are difficult to support empirically but which have gained sufficient public currency to influence environmental and development policies on upland watersheds. These simplifications become popular because they fit prevalent worldviews, suggest simple 'technical' solutions, and may serve the interests of groups with vested interests.

A watershed approach

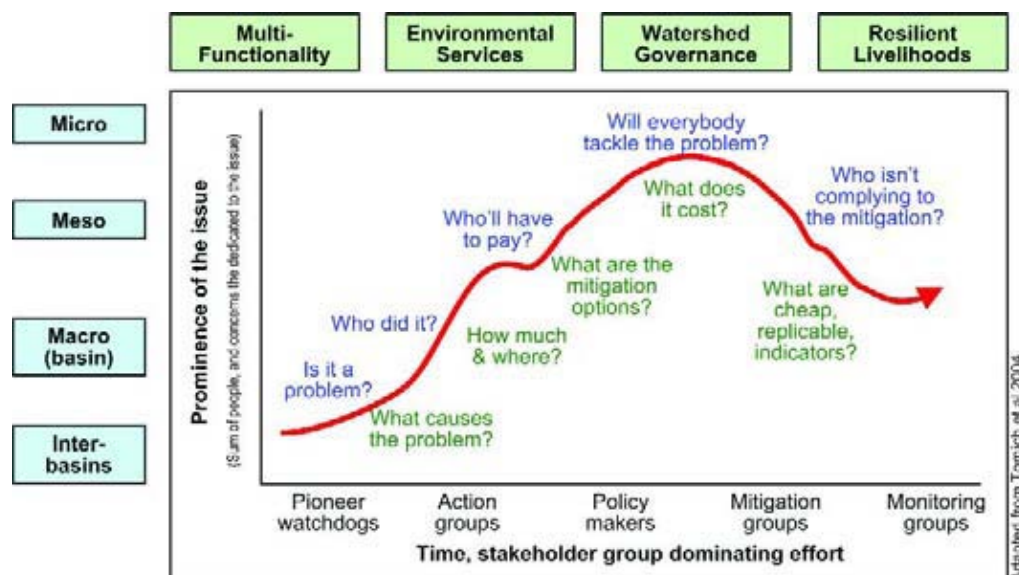
To move beyond simplifications, it is necessary to examine the **multi-functionality** of watershed services, **institutional arrangements** of watershed management, **decentralisation** for natural resource management, and **resilient livelihoods** for watershed people in the Himalayan region. To address discriminatory policies and practices aimed at upland farmers based on myths (misperceptions and misinterpretations) about human impacts in upper watersheds and unequal power relations between the uplands and lowlands, it is necessary to strengthen the capacity of local governments, NGOs, and research professionals to support good governance and sustainable livelihoods in mountain watersheds.

Focusing on watershed perspectives, our research questions are the following.

- How is the watershed defined? By whom? What watershed services are perceived by different actors?
- How do local people manage the ecosystem's capacity behind those services; viz., management practices, local institutions, and governance systems?
- How are local people affected by large-scale processes (state conservation and development policies, market economy, technology innovations, and climate changes), and how do they shape or cope with the resulting changes?
- What are the interactions between upstream and downstream? How do the local communities link with institutions and organisations on other scales and what are the roles of social networks in resilient livelihoods?
- Are there any win-win scenarios or good practices? Can they be duplicated and in which conditions?
- How can macro-watershed regional perspectives and comparative analysis contribute to new dialogue and policy-making processes?

The following four potential topics are relevant to mountain watershed discourse.

Multi-functionality of watershed services: Himalayan watersheds have suffered from widespread dramatic land-use and land-cover changes in past decades. Deforestation, land-use conversion, habitat modification, agricultural intensification, migration and urbanisation, and, most recently, afforestation have resulted from changing government policies and globalisation. Past research revealed a strong link



The watershed approach: a framework for a science-policy linked dialogue process

between watershed deterioration and land-cover changes over time. Oversimplification of the relationship between land use and water resources is predominant in land-use planning and watershed conservation. Discussions with institutions and individuals revealed a lack of data and scientific understanding, especially of the spatial and temporal dynamics of land use and hydrological processes in mountain watersheds.

Institutional arrangement of watershed services: Awareness and appreciation of mountain watershed services and their economic value are critical for developing integrated watershed management. This is believed to be the way to facilitate sustainable watershed management and site-specific reward schemes that directly take the needs of poor communities into account. Negotiations between service providers and beneficiaries and development of actual reward schemes also need to be facilitated. Specifically, we recognise the need to link research to applicable models that can measurably improve the livelihoods of the upland poor by equitably distributing the benefits of good upstream forest and land management. The Chinese Upland Conversion Programme (UCP) and the Natural Forest Protection Programme (NFPP) can be seen as state-driven environmental benefit schemes rewarding upland communities for services provided to downstream communities and to their own environment in the uplands.

Decentralisation of watershed governance: Physical inaccessibility and socio-political marginality often mean that mountain people are left out of overall socioeconomic development. Increasing demands for environmental services from mountain watersheds cause policy-makers to re-examine their social and ecological status, as well as their policies towards governing mountain people and mountain resources. To catch up with development in the lowland plains, most states in the Himalayas have devolved from a centrally controlled to a decentralised system with the introduction of a market economy, requiring new laws and regulations, policies, instruments and incentives, institutional strategies, and mechanisms to be explored, tried out, and adopted to improve the livelihoods of upland communities; manage the conflict and competition between upland and lowland communities over resource rights effectively; and guarantee equity in the distribution of land, forest, and water resources. Collective forest management in China, joint forest management in India, and forestry user groups in Nepal are examples.

Resilient livelihoods: marketing 'niche' products

Livelihood and land practices in mountain watersheds are driven basically by the needs of local communities and demands of local and regional markets. People's livelihoods often take advantage of the mountain ecology to produce and process 'niche' products for sale in lowland markets. In Himachal Pradesh, India, a women's cooperative built a thriving enterprise by producing pickles from non-timber forest products. In Yunnan, Southwest China, local farmers collect matsutake mushroom (*Tricholoma matsutake*) from oak-pine forests and sell them to Japan for over fifty millions US dollars annually. Both Nepali and Bhutanese people collect medicinal plants, particularly *Cordyceps sinensis*, earning millions of dollars. Mountain products such as honey, cheese, fruits, and vegetables, are becoming increasingly popular with urban people both locally and internationally. Increasing private investment and state support for tourism and enterprise development in mountain regions have profound impacts on local livelihoods. Such changes have led to greater mobility in terms of both labour and cash. Policy interventions should be seen as a controlling agent for preventing over-use or misuse of natural resources, preventing their depletion. Access to better infrastructure normally results in the expansion of markets and market opportunities.

People's access to natural resources and responses to economic opportunities, as regulated by institutional factors, drive resource use, including land degradation.

Conclusion

Many watershed case studies support the conclusion that neither population nor poverty is the primary cause of degradation. Rather, people's access to natural resources and responses to economic opportunities, as regulated by institutional factors, drive resource use – including land degradation. Marketing ecosystem services from the mountains provides new opportunities for mountain farmers that are continuously influenced by increasing demands and economic and policy instruments from urban centres. Extreme socioeconomic conditions (such as the Asian economic crisis in the late 1990s) and biophysical events can trigger further environmental change in mountain regions.

Land-Use Change Induced Watershed Carbon Flux and Climate Change

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Nakul Chettri

Integrated landuse management in Sikkim, India

Globally, land-use changes are cumulatively transforming land cover at an accelerating rate. In mountain ecosystems such changes are closely linked to the issue of sustainable socioeconomic development, since they affect essential elements of natural capital such as climate, soils, vegetation, water resources, and biodiversity.

Land transformation may result in a wide variety of changes, many of which can be significant on the global scale – including greenhouse gases and potential global warming, loss of biodiversity and loss of soil resources, and the regional impacts contributing to climate change. In the mountains, watersheds can be considered as functional units of natural resource management for sustainable development. Understanding the dynamics of watershed functions includes physical characteristics such as hydro-ecological linkages between land uses, resource dimensions, and socioeconomic conditions. Socio-

economic demands and natural resource use are interactive (Rai and Sharma 1998; Sharma et al. 1998). Increasing stresses on natural resource use and their impacts at the watershed level can also result in cumulative impacts at the regional level. Carbon is an important indicator for studying the mechanisms of change in watershed functioning as a result of changing land-use in mountain areas.

Of the estimated eight billion tons of carbon dioxide injected annually into the air by human activity, three-fourths come from the burning of fossil fuel and the remainder from land-use change and cultivation of land



Nakul Chettri

Forests store 150-280 tons of carbon in one hectare of forests in the Sikkim watershed

for agriculture (Odum 1971). Over the last three centuries, the total global area of forests and woodlands has decreased by 12 trillion sq km, grasslands and pastures have declined by 5.6 trillion sq km, and croplands have increased by 12 trillion sq km (Richards 1990). Such large-scale change has consequences on regional and global climate, more prominently through modification of global carbon, nitrogen, and water cycles, and increased rates of extinction of biological resources. Changes, in terms of both the conversion of land for cultivation and the intensification of agriculture on land already cultivated, have accelerated globally.

Most prime agricultural lands, with the exception of some areas in the tropics, are already cultivated, and any major increases in food production are likely to come from the application of fertilisers, pesticides, herbicides, and irrigation. Irrigation of cropland has expanded 24-fold over the past three centuries, with most of that increase taking place in the last century. This practice has led to increased carbon (methane) emissions, while the increasing frequency of land tillage worldwide has affected soil carbon. The major global initiatives on this issue are the International Geosphere-Biosphere Programme and the Human Dimensions Programme's Science Agenda on Land-use/covers Change.

Carbon dynamics depend on land-use change and consequent impact on ecosystem components. The evaluation of carbon dynamics thus requires a detailed description of land-use patterns and change in both time and space. Soil is the largest pool of terrestrial carbon in the biosphere, storing some 1,500 peta grammes ($\times 10^{15}$) of carbon in the upper metre of mineral soils, about 2.5 times more than the carbon contained in terrestrial vegetation. Globally, soils constitute one of the five principal carbon pools; others are oceans, biomass, the atmosphere, and fossil fuels. The conversion of forests to agriculture and other uses has resulted in net release of carbon dioxide to the atmosphere. Studies have shown that the carbon content of soils declines with agricultural use. Improved land-use management with greater carbon sink potential is an essential prerequisite for carbon sequestration. Application of improved management practices is projected to sequester between 400 and 800 metric tons of carbon per year worldwide. Carbon dioxide emissions through respiration, from both vegetation and from decomposition of organic matter, increase with global warming. Soils are sources and sinks of carbon as a result of both changes in carbon content per soil unit (via assimilation and decomposition) and of the erosion and deposition of soil. The export rate of dissolved organic carbon by river water is equally important in global carbon budgets and flux.

Land-use transition in the Himalaya has been driven by both global environmental change and the market economy. The major driving forces are economic, policy, institutional, technological, and demographic factors. The visible land-use transitions are urbanisation, sedentarisation, forest conversion to other uses, agricultural intensification, habitat modification, migration, and population dynamics, and loss in biodiversity. Such large-scale land-use transitions have changed the carbon dynamics in the Himalayan region.

Mamlay Watershed in Sikkim in the Eastern Himalaya is a good example of a populated middle hill (300-2,600masl) watershed where land-use change and its consequences on carbon dynamics were studied. During a 13-year period more than 34% of the land use changed in this 3,014ha watershed. The changes were conspicuous in conversion of forests to agricultural land (28% converted) and degradation of forests from dense to open canopy (6% changed) conditions. A similar trend in land-use change has been reported from all over the middle hills of the Himalaya. However, in the case of Nepal much of the lost forests were regenerated from community forestry initiatives. Carbon dynamics within a land use implies soil, vegetation, humus, litter, soluble carbon in precipitation partitioning, soil erosion, overland flow, loss through discharge in river systems, microbial biomass in soils, and respiration and harvest fluxes. This clearly shows that carbon cuts across all ecosystem components entailing its qualification as a good indicator for understanding watershed functioning and processes.

The land-use change over 13 years (1988-2001) in the Mamlay watershed resulted in a net release of 305×10^3 tons of carbon into the atmosphere (see Table 2). The reduction of forest biomass contributed 119×10^3 tons of carbon by vegetation and 186×10^3 tons of carbon by soil, translating into a release of about eight tons of carbon from a hectare of land every year in the watershed. The stock of carbon in vegetation and soils in the watershed amounted to 624×10^3 tons in 2001. Using a similar rate of forest conversion in the Sikkim State of India and the Indian part of the Himalaya, carbon release into the atmosphere was projected at 22×10^5 and 520×10^5 tons of carbon annually, respectively. Such trends have to be reversed through integrated watershed management approaches and efforts to do so are being carried out in the region by implementing investment projects. The development and resource management scenarios have to be driven by lessons learned from regional watershed research

Land-use change from forests to	Area (ha)	Total carbon release ($\times 10^3$ ton)
Degraded forests	447	169
Agricultural land	486	110
Wastelands	113	26
Total	1046	305
Total watershed area: 3014 ha		

Source: Sharma (2003)

Land-use change and carbon release into the atmosphere from Mamlay Watershed from 1988 to 2001, in Sikkim in the Eastern Himalaya

initiatives such as the People and Resource Dynamics Project (PARDYP) of ICIMOD and other global initiatives such as the next generation of watershed management projects and programmes (FAO 2006).

Land-use transformation and management of mountain watersheds are key issues of concern for the global carbon balance. The global scientific community and initiatives like the Intergovernmental Panel on Climate Change (IPCC) and the United Nations' Framework Convention on Climate Change (UNFCCC) should study mountain watersheds to understand, manage, and develop strategies for responsive adaptations to climate change. Responses should be socioculturally sensitive and economically viable, considering sustainability as one of the pillars of development.

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Watershed Management in the West of Bhutan

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Hydro downloading training in Woochu (Bhutan)

The European Commission-Bhutan Wang Watershed Management Project (WWMP) began in late 2000, started moving forward in 2002 after funds arrived, and will be operational until June 2007. The project document, prepared in 1996, describes more of a support programme for the Renewable Natural Resources (RNR) sector in four dzongkhags (districts) in the west of Bhutan – Chhukha, Ha, Paro, and Thimphu – rather than a watershed management programme.

However, as the Wang Chhu River is the most important source of hydropower in Bhutan, the project management unit based in Paro Valley took the title of the project at face value, and has attempted over the years to take a more holistic view of the area and bend the activities towards a watershed management approach.

These efforts are encouraged by the fact that hydroenergy production has been the primary engine of growth in Bhutan during the past three five-year plan periods. The recent commissioning of the 1,020 MW Tala Hydropower Project has further increased the total energy production capacity. Once all the Tala turbines are on stream, more than 85% of Bhutan's hydropower capacity will be located within the Wang watershed.

There is no doubt that the two hydropower corporations located in the Wang watershed will be the main contributors to the GNP, in terms of both revenue to the Royal Government, and demand for products and services from the construction and transport sectors. Thus, activities carried out in the Wang watershed area are likely to account for at least one-third of the economy by the end of the 9th Five-Year Plan (2008).

The health of the Wang watershed, the catchment that is vital to the national economy of Bhutan, is therefore crucial. Thus the WWMP has followed two parallel and mutually supporting paths that originally planned to support the RNR sector and the watershed approach. In the following, we provide a brief resumé of just a few of the activities undertaken.

The RNR sector support path

The activities supporting the RNR sector in the Wang watershed include financial and technical support to agricultural, irrigation, livestock, mainstream, and social forestry activities. Among others the project has supported crop demonstrations, crop field trials, farmer training, the formation of farmer groups and cooperatives, artificial insemination campaigns, provision of breeding stock, the promotion of backyard units (cattle, pigs, poultry, and fish), the establishment of community and private forests, the preparation of field manuals for forestry and agriculture, and the promotion and demonstration of innovative technologies.

Successes

- The Bhutan forest sector now has a Forest Management Code and a series of four manuals describing all steps in the formation of community forests.
- The farmer field school approach to extension was introduced in 2004 and was well received by both farmers and extension staff. In the years since then, dozens of schools have been held, yields on the integrated management plots are more than double the farmer practice plots, many farmer-led experiments have been undertaken, and the WWMP has responded to requests to run FFS training and supervise schools in other parts of the country.
- The soil conservation programme introduced formal field training in the four districts, and now over 30 demonstration plots have been established in degraded agricultural and forest areas. As a result, the WWMP provided technical know-how and resources to the three national land management campaigns, inspired by the Minister

of Agriculture, that have been undertaken in different parts of Bhutan over the past 18 months.

- More than 30 polytunnels have been introduced to the Wang watershed and selected farmers in the past two years. These have all been recently fitted with drip irrigation kits and, early in 2006, specialists from India's Horticultural Training Centre in Pune provided a week-long training of trainers course to extension staff. One immediate success story derives from Ha District where, due to the longer growing season created by the micro-climate of the polytunnel, one farmer has for the first time grown tomatoes. There were none of the usual marketing problems, as he found ready customers in the market of Ha town.
- Two success stories arise from activities related to group formation. A dairy cooperative has been established in Paro Valley, which, although it has struggled for many reasons for two years, is still up and running and with a growing network of producer members. There are marketing problems, but the Department of Livestock, Ministry of Agriculture is soon to start the construction of a yogurt factory, and this will hopefully guarantee the future of this producer group. The second group which looks destined for a bright future is a mushroom production group based in Chhukha. Shitake mushrooms are being grown, the group is equipped with drills, driers, and other necessary materials, and sales to both the local and international markets are expected.

Both ICIMOD and WWMP have been supporting the yak herders of Soe Yaksa, a widespread community of the Brokpa ethnic group based at 3,800 masl. ICIMOD has provided funds and expertise to improve the winter feed situation through the cultivation of



Yak winter feeding



Yak butter moulds and improved butter packaging

improved oats and to re-introduce the practice of pasture burning in the winter on a trial basis, much to the anxiety of foresters. This practice had been banned for many years, but the result of the ban was significant degrading of pastures as unpalatable shrubs and plants took over. WWMP supported the marketing of yak butter through design and provision of butter moulds and packaging and cold boxes for transportation. Fridges have also been supplied. This year 2,500 kg of yak butter is expected to be transported over two days to Paro Valley; trials in previous years have shown that there is a good market for this product. The next trial will involve dry yak meat strips similar to the biltong of Southern Africa.

- The promotion of improved backyard units for cattle, pigs, and chicken, some of which have been integrated into fish farming units, has also been a success. Through strong efforts by district extension staff, communities, and individual farmers, hundreds of these units have been established, permitting households to become more self sufficient in terms of both family nutrition and income. A spin-off advantage has been the greater amount of manure produced for crop fields.

The watershed management approach

In the original project document, there were only a few elements concerned with watershed management

– almost a passing reference. Over the years, efforts have been made to strengthen these components, and the results are outlined below.

- In 2005, the project prepared a draft proposal for a system of watershed management that could be adopted in Bhutan. The country was split into eight main watersheds, and systems of governance and decision-making were developed through which all stakeholders were included, from local communities through sub-districts (geogs) and dzongkhags to the central Ministries of the Royal Government. Guidelines prepared for the preparation of the 10th Five-Year Plan (2008-2012) made specific reference to the need to plan on a watershed basis and thus, this document – the first to describe the modus operandi of development planning by watershed – eventually received considerable attention.
- The Royal Government of Bhutan has for some years been promoting the decentralisation of decision-making and responsibility for development activities, first to the dzongkhags, and now to the geogs. This is a major programme, and WWMP attempted to assist through development of training programmes for the extension and administrative staff in its four western districts. This training of geog and RNR staff to support the decentralisation process and bring the sub-districts into the mainstream as one of the main stakeholders in



Soil and water conservation training in Tashigang. (inset) A farmer field school cabbage plot in Ha District

planning and development was a success, and the training programmes developed have been taken over in toto by the Department of Local Governance (DLG), which is now responsible for the integrated capacity development of the geog administrations in all 20 dzongkhags. The four dzongkhag facilitation teams established by WWMP for human resource development in the Wang Watershed continue to function under the guidance of the DLG.

- The land-use planning programme was developed in response to the need for participatory planning at community and geog levels, and supported the efforts to promote decentralisation. Over 100 staff concerned with planning, administration, financial management, and RNR development from the four districts were trained in land-use planning and the identification of hot zones which were under threat, where land degradation was taking place, and where areas with development potential existed. As a result, many maps were produced and degraded areas received attention.
- The environmental education programme, an essential part of any watershed management programme, was undertaken with the assistance of the Royal Society for the Protection of Nature (RSPN), through the Nature Clubs of 14 secondary schools in the Wang watershed. Action research programmes were designed and undertaken in the catchment areas of the schools by the students themselves. This included mapping, water and land surveys, identification of major problems, meetings with the communities, and plans of action. In some cases, water-borne health problems were a concern (i.e., *E. coli* levels in the stream), in others water shortages were identified, still in others, disposal of urban rubbish was the main dilemma. These practical activities were much appreciated by schools, communities, and the education authorities and, as a result, the best elements of the programme have been worked into the national school curriculum. Curriculum development activities along these areas are currently being piloted at Class 7 and 9 levels. Since 2005, the WWMP environmental education programme has been adapted for use in the non-formal sector, and, in 2006, nine adult education centres are involved in this sub-programme, pilot testing the manual on 'Community Watershed Management' under the guidance of trained staff.



Controlled burning of yak pasture in the winter on a trial basis

- Little work in the field of hydrometeorology has been undertaken in the small catchments that are the source of the waters that feed the main rivers on which the hydropower stations are situated. Little is therefore known about the physical conditions relating to seasonal water availability, supply and use in these crucial sub-catchments; such knowledge is even more crucial currently with the growing concerns relating to climate change and the potential loss of Himalayan glaciers. WWMP has established networks of stations in four sub-catchments, a total of 42 stations, 18 hydrological and 24 metrological. These are being managed in conjunction with the Department of Energy, which will be responsible for monitoring the networks following the closure of WWMP. Over 50 staff members have been trained in the catchments to monitor these stations, and the data collected in the first two years is being analysed.

For the project management unit, with only seven months remaining of the project, the challenge is to institutionalise the successes – and find a home that can technically and financially support the programmes into the 10th Five-Year Development Plan (2008 – 2012).

For more information on the WWMP – achievements, hurdles, difficulties, failures – please contact the Co-Directors at WWMP,

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Watershed Management in Nepal

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In Tanahun District, Nepal, watershed management integrates agriculture, forestry, pasture and water management measures

The institutional development of watershed management in Nepal commenced in 1974 with the inception of the Department of Soil Conservation and Watershed Management (DSCWM) as the principal authority for undertaking watershed management. DSCWM started by piloting a programme in four selected watersheds and river training activities at priority sites, and gradually expanded with the establishment of District Soil Conservation Offices (DSCOs).

At present, DSCWM operates watershed management programmes in 55 of the 75 districts of Nepal (see figure). Department and district-level offices have multi-disciplinary staff – mainly in forestry, agriculture, and engineering – to provide the services necessary to carry out integrated watershed management programme.

Watershed management programmes in Nepal

The scope of watershed management can be defined from a narrow site-specific focus dealing with a particular issue, such as high rates of soil erosion, to a broader rural development focus to fit the priorities of local organisations (p.33 box). In Nepal, the scope of

soil conservation and watershed management is broad and integrates forestry, agriculture, pasture, and water management measures applied for erosion control. It also includes income-generating activities related to proper use of soil and water resources.

The Forestry Sector Master Plan (MPFS 1988) recognised soil conservation and watershed management as one of the main forestry sector programmes related to land use and rehabilitation of degraded lands. The DSCWM implements a diversified programme of activities to mitigate land degradation and increase productivity (p.33 box). Bilateral and multilateral donors¹ were involved in providing support to the implementation of the SCWM programme in Nepal.

¹ Such as the United Nations Development Programme/Food and Agriculture Organization (UNDP/FAO), the Danish International Development Agency (DANIDA), the Japanese International Cooperation Agency (JICA), the German Agency for Technical Cooperation (GTZ), the Australian Agency for International Development (AusAID), CARE International in Nepal, SNV and the Swiss Development Cooperation (SDC), the European Union (EU), the United States Agency for International Development (USAID), and the Department of International Development (DFID-Nepal)



The Soil Conservation and Watershed Management Programme in Nepal

Scope of watershed management

The scope of watershed management can be broadly categorised into three points² as follows.

Narrow focus: such as management of upland wild-land associated with water resource development.

Broader focus: such as management of agriculture, forest, and grazing lands associated with water resource development.

Rural development focus: such as management of all lands associated with their potential for social and economic development including all components, e.g., agriculture, forests, grazing, health, education, markets, transportation, credit.

(Upadhyay 1985)

Programme activities of DSCWM

Land-use planning: watershed and sub-watershed management plans based upon scientifically assessed land capability and technical services for land-use development.

Land productivity conservation: on-farm conservation, grass plantation, fodder/fuel-wood/fruit tree plantation, agroforestry, and greenbelt/shelterbelt establishment.

Natural hazard prevention: gully treatment (Figure 2), landslide treatment, torrent control, stream-bank protection, and degraded land rehabilitation through bioengineering methods.

Infrastructure protection: road slope stabilisation, trail improvement, irrigation canal protection, and water source conservation.

Community soil conservation: extension education, demonstration, training, workshops, study tours, workshops, school conservation, and exhibition.

(DSCWM 1998)

The approach

The implementation of the soil conservation and watershed management programme was concentrated in selected watersheds. However, with the inception of Integrated Rural Development Projects in 1982, SCWM activities were also implemented through scattered projects, through which the wide range of SCWM activities were implemented in a whole district. The importance of people's participation and integrated approaches in watershed management are also emphasised by the Master Plan for the Forestry Sector (MPFS 1988) in the implementation of the SCWM Programme.

To promote local governance in development and implementation, the approaches of the DSCWM have changed with time and needs. Until 1980, the *"What can the project do to help people?"* motto outlined the implementation approach of the DSCWM (Sthapit 2000). Activities were planned and implemented without involving the communities, thinking that these activities would help the community raise their living standards. The approach turned out to be unsuccessful as most of the activities implemented were not priorities for the community and subsequently the community cared little to maintain the activities in the long run.

In the 1980s and 1990s, the development motto shifted to *"What can the project do with people's participation?"*. With this approach, activities were still planned with no or only very little involvement of the target group. After the programme was approved, people's participation was sought for implementation.



Gully treatment in Jhikhu Khola, Kabhre District

However, due to inadequate people's participation in programme planning and formulation, people's involvement became somehow arduous. Officials had to manipulate the participatory inputs in order to achieve the physical target set by the government system. Therefore, in most cases, people's participation was not achieved in the real sense. In 1993, the DSCWM put forward a strategy to ensure the implementation of the SCWM programme in line with integrated watershed management and with people's participation. The implementation approach gradually shifted to making communities responsible for identification, planning, management, and implementation of activities on both their own land and community land. This is done in order to let communities control the development activities taking place within their area. In other words the current strategy is "What can the people do with project/programme participation?"

Issues and recommendations

Watershed management demands harmonised integration of relevant aspects for the holistic development of communities. The issue here is what is the extent of integration: neither the integration of a few aspects which do not produce an impact, nor integration of many aspects, thus hindering implementation is good. For practical reasons, integration must be sought to the extent possible which ensures the programme gains momentum to function. This depends on social, political, and bureaucratic systems. So this is the issue to be decided based on local conditions.



People's participation in planning

Decentralised development strategies are required to ensure that beneficiaries are involved in every step of development to make the results meaningful outcomes for the target group. But decentralised development needs to consider the administrative unit as its working unit, whereas, observing the impact of upstream activities on the downstream area, the watershed should be the ideal working unit. Whether or not a watershed or an administrative unit is the working unit for watershed management has become an issue. There are pros and cons with both working units; therefore, with an overall objective for water resource development a watershed is preferable, whereas with an overall objective of rural development, the administrative unit is preferable. However, taking all administrative units within the watershed could be a compromise strategy.

Conclusion

The increasing trend of involving people at every step of development builds an environment for better ownership, responsibility, and accountability. Decentralisation and governance increase the chances of implementing a community's needed activities on a sustained basis. The community begins to feel that development is their right rather than a mercy from development agencies. More effort should be made to emphasise a decentralised implementation approach that meets local needs.

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Securing the Future: A Watershed Approach

Uttaranchal, India

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Raghu Bir Singh Rawat

Panoramic view of Uttaranchal, India

The Himalayan Mountain State of Uttaranchal is characterised by a relatively young geology with a complex physiography which is tectonically unstable. Soils are generally shallow. Temperature variations, moisture conditions, and local factors are wide-ranging in the Himalayas, resulting in rich biodiversity of both flora and fauna.

Young rock formations, friable surfaces, steep slopes, extreme seasonal and diurnal temperature changes and intense monsoon rains make the Himalayas prone to erosion. At the same time, the Himalayas are water towers for some of the most important Asian rivers, i.e., the Ganges, Brahmaputra, Indus, and the Mekong. Widespread deforestation has aggravated erosion, led to increased downstream flooding, and reduced base flows. This deterioration in the natural water resources has resulted in loss of biodiversity and natural habitat. Agricultural activities on steep slopes and depleting vegetative cover with consequent erosion are also destroying the ecosystem and the productive potential of this area of the Himalayas.

The evolutionary process of integrated watershed management in India began with the first generation projects during the 1980s. They were conceived primarily to target forest productivity and conserve soil, but they had limited success. The second generation of projects adopted a more integrated management approach to all watershed resources, taking into consideration better conservation and use of all natural resources at watershed and community levels. This involved the active participation of local communities and all stakeholders, resulting in meaningful and successful long-term sustainable development.

A silent yet powerful revolution – the Integrated Watershed Development Project – was kick-started in

1999 throughout Uttarakhand. It was a project that was unprecedented, not only in its magnitude and vision but also in the fact that it actually aimed at social empowerment and sustainable development at grass roots' level. Besides ensuring people's participation, the project advocated implementing gender mainstreaming integrated into project execution: the project targeted women as its major partners. Some of the major aspects and impacts of the project are summarized in the following. More details can be found in WMD (2005) and WMD (undated).

An insight into the project

With financial assistance from the World Bank, the project had an added emphasis on growth through empowerment. With the belief that sustainable growth is possible only through grassroots empowerment, the project promoted changes that were unprecedented in the history of the state. The project area covered three districts (Pauri, Nainital, and Udham Singh Nagar) of the Shivaliks where 1,573sq km were included. In 24 micro watersheds, 493 revenue villages were developed. This was the outcome of the five-year project – Rs 1,857 million were invested benefiting a population of 175,000.

The project faced tremendous challenges in terms of environmental disasters, a dismal economic backdrop which was a result of the low priority given to environmental conservation, inadequate people's participation, poor access and benefit sharing, unequal development within watersheds, and low levels of efficiency.

In a fresh approach, the project was showcased as a people's project in which the communities were not only beneficiaries but also partners in progress. This was implemented by strengthening village-level institutions, bringing about a dramatic social transformation and self-empowerment drive.

Income-generating activities such as cultivation of organic medicinal and aromatic plants, along with alternative high-value cash crops were undertaken resulting in substantial additions to local incomes. Various training programmes and workshops providing knowledge about artificial insemination and better breeding techniques, augmented by para-vet centres, have been very beneficial to the rural people involved in livestock development. With these initiatives, milk production has increased 35-56%.

The project promoted appropriate use of land and natural resources for fuel, fodder, small timber, and success of new plantations. This approach resulted in tremendous improvements in these parameters. Fodder deficits were reduced by 21% (62% to 41%). The percentage of new plantations surviving was as high as 70%.

Key issues addressed during the project included non-arable land treatments, soil conservation, and effective use of water resources. The intensity of irrigation was increased by 26% and the net irrigated area increased by 30% (4,244 ha). Even soil loss was reduced by 26%.

One of the first tasks undertaken by the project was building village infrastructure, commencing with village bridge paths and small contact bridges. This initiative led to the improvement of a 681 km long bridge path in 281 villages, benefiting 58,815 people.

The road ahead

On the basis of the implementation of this project in Uttarakhand, the following strategy could be used as a road map for addressing rural problems through integrated watershed development.

- Empower and strengthen capacity-building of local village-level institutions to involve them in the decision-making process.
- Promote sustainable production of biomass and restoration of ecological balance through conservation and improvement of natural resources.



Organic production of medicinal plants in Garhwal, Uttarakhand

- Replenish the ecological equilibrium to increase fodder and fuel availability in the local community.
 - Introduce low-cost conservation measures/strategy based on indigenous practices and devices with greater reliance on measures for conservation of vegetation.
 - Focus on strengthening the livelihood system of the rural poor to improve both their social and economic status.
 - Cultivate high-value medicinal and aromatic plants, high-value cash crops, bamboo and Jatropha for income-generating activities.
 - Improve land management through good practices and control of soil erosion.
 - Introduce better agricultural practices and crop diversification to ensure subsidiary income for the local population.
 - Conserve and manage rainwater for sustainable agriculture in rainfed areas with low-cost small dams to augment activism of water courses (drainage lines).
 - Form self help groups for poor marginalised groups, women, and other poor people to share benefits and become involved in decision-making.
 - Promote rural health and sanitation through awareness generation and through construction of community toilets and drainage.
- Coordinate and converge, with proper networking, all stakeholders and linkages with scientific institutions and civil society organisation for technical know-how, and social mobilisation groups.

Community participation forms the backbone of any social development project. Experience has shown that development and resource management activities by state agencies have become increasingly difficult and costly without yielding the results desired. On the other hand, steps undertaken that involve local communities, self-empowerment of village institutions, and incorporation of gender-sensitive components in projects have improved the situation tremendously. This Integrated Watershed Development Project in Uttarakhand has taught us valuable lessons that can be used to implement similar projects throughout the entire mid-Himalayan range.

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Watershed management on the web

The Internet is one of the easiest sources of local and global knowledge on almost every subject. Its relevance for knowledge about watershed management has increased recently as more and more watershed management practitioners across the globe are using web-based services to share knowledge and discuss issues and options in watershed management, education, and training. Not only researchers, development professionals and decision makers, but also grassroot communities use web portals to improve their knowledge and skills in watershed management. In India, e-choupal networks (www.echoupal.com) are being integrated into watershed management initiatives to create rural knowledge hubs where information is provided in regional languages.

A search for watershed management on the google website (www.google.com) renders a whole range of results, but for those who are interested in



watershed management in the Himalayas, the most useful links are the following.

- Watershed Management Discussion Forum at www.fao.org: FAO in collaboration with the Institute for Resources, Environment, and Sustainability at the University of British Columbia created this forum under the Watershed Management Initiative of the Mountain Partnership (www.mountainpartnership.org), of which ICIMOD

and FAO are members. In this forum watershed management practitioners can share information and ideas of successful (and not so successful) approaches based on practical experiences in watershed management.

- World Overview of Conservation Approaches and Technologies (WOCAT: www.wocat.org): this initiative provides information about potential soil and water conservation (SWC) technologies and approaches and links to important institutions and people working in this field.
- HIMCAT extranet (www.extranet.icimod.org.np/himcat): Himalayan Conservation Approaches and Technologies (HIMCAT) extranet is a virtual forum hosted and coordinated by ICIMOD for strengthening cooperation, collaboration, and communication among watershed management and soil and water conservation practitioners in the Himalayas.
- ICIMOD website (www.icimod.org): this is also a useful source of information on watershed management and the information posted about the

People and Resource Dynamics Project (PARDYP: www.pardyp.org) is particularly useful.

Many other global and national level online initiatives offer useful information on watershed management. These include www.wca-infonet.org hosted by the Food and Agriculture Organization, and <http://gov.ua.nic.in/wmd/html/UDWDP/udwdp.htm> of the Government of Uttaranchal (India). The Mountain Forum (www.mtnforum.org) and its regional networks (for example the Asia-Pacific Mountain Network) provide an important online forum where people interested in watershed management can participate in online discussions, organise e-conferences, and visit a rich online library to seek out relevant information but also to contribute materials. For those interested in a certificate-level distance learning course in watershed management, <http://www.rmcs.ubc.ca> of the University of British Columbia (Canada) is a useful link.

*For additional watershed management links on the web: please refer to the 2006 FAO publication; **The new generation of watershed management programmes and projects** Rome: FAO Annex: 123-128.*

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Pakistan Forest Institute, Pakistan

The Pakistan Forest Institute (PFI) is a federal government organisation under the Ministry of Environment, Government of Pakistan. The Institute was established in 1947 to carry out research in forestry and allied sciences and impart education and training in forestry, rangelands, wildlife, and watershed management to candidates from provincial forest departments and other agencies engaged in forestry activities, as well as students from foreign countries. It has been affiliated with the University of Peshawar

since 1958 for the purpose of examinations and of awarding degrees in forestry.

PFI is located on the campus of the University of Peshawar where the Institute occupies an area of about 93ha. Among its facilities are an auditorium, committee room, museum, central library, lecture rooms, research and teaching laboratories. There are also student and training hostels, houses, a guesthouse, and officers and staff clubs as well as a dispensary.

Research nurseries and experimental plots for silviculture, genetics, and medicinal plants are located on the estate and throughout the country. A botanical garden with 271 species of trees, shrubs, and climbers helps forestry graduates as well as students to familiarise themselves with these species.

The Institute's vision is to be recognised as a place of excellence and ahead in the field. Its mission is to improve the quality of life through scientific management of forests, rangeland, wildlife, watersheds, environmental protection, and biodiversity conservation in Pakistan through excellent research and training activities carried out in a creative and friendly learning environment.



Ismail, Muhammad

The Institute:

- promotes forestry education and research appropriate to the continued development of the forestry sector and conservation of the resource base;
- collects and disseminates information on forest management and development and forest products and their use;
- coordinates activities within Pakistan relating to research and development, publicity, and

development of forests and wood industries and to liaise with relevant bodies outside Pakistan; and

- advises the Federal and Provincial governments and regional forest departments and related industries and farmers on planting, wood production, and use

The Institute is organised in five divisions reporting to the Director General: forestry research, biological sciences' research, forest products' research, sericultural research, and forest education – the latter offering B.Sc. and M.Sc. degrees in forestry .

Department of Soil Conservation and Watershed Management, Nepal

Nepal's Department of Soil Conservation and Watershed Management (DSCWM) was established in 1974 as a department of the Ministry of Forests and Soil Conservation with the mandate to develop the national capacity for watershed management. Until 1974, soil conservation and watershed management activities were scattered throughout various divisions of the Department of Forests and Department of Agriculture: land rehabilitation activities, such as reforestation, gully plugging, and slope stabilisation, were carried out experimentally by the Forest Department in degraded forests, and the Department of Agriculture applied soil and water conservation techniques to agricultural lands.

Many of Nepal's watersheds are in a state of physical and biological deterioration resulting from overexploitation of watershed resources by their inhabitants. Restoration and improvement of watersheds are essential for the betterment of the national economy and the environment, and DSCWM aims to contribute to meeting people's basic needs for forest and food products by improving the productivity of land through the conservation and management of watershed resources. It assists in maintaining ecological balance by reducing pressure from hazards such as floods and landslides.

To date, the DSCWM has 81 professional, 185 mid-level technical, and 266 administrative staff working in



Keshar Man Sthapit

the central and district offices and channels services through 45 permanent and 10 temporary district offices. The Department has trained numerous watershed users and community development groups in activity planning and implementation. It has carried out soil erosion studies on different land uses and sedimentation surveys of the major lakes and reservoirs in Nepal. Systematic guidelines for prioritisation of watersheds, participatory planning and implementation, technical guidelines for survey design of soil conservation activities, and bioengineering techniques are in place. DSCWM has collaborated with ICIMOD since its inception, particularly in carrying out soil loss and erosion studies and implementing soil conservation and watershed management activities in the Jhikhu Khola and Yarsha Khola watersheds.

Check out our new look website

www.icimod.org

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



Board Meeting Highlights

36th Meeting of the ICIMOD Board of Governors Special Board Meeting, July 2006

A decision was made at the 35th meeting of the ICIMOD Board of Governors in Shillong in November 2005 to hold a special Board meeting in July 2006, in Kathmandu. This meeting, resulted in the selection of the Director General designate. In addition, preliminary feedback was received on the Fourth Quinquennial Review of ICIMOD.

A Search Committee consisting of the Board Chairperson, Mr. Muhammad Ismail Qureshi; Vice Chairperson, Dr. Anne Whyte, who chaired the Committee; Independent Board member, Dr. Rob Visser; and the Board member for Nepal, Dr. Ram Prashad Choudhary established, and with the assistance of Mr. Gerald Bourier, Consultant to the Committee, three candidates had been short-listed according to the criteria established by the Board: credibility among RMCs, donors and staff; leadership and effective communications skills; ability to establish good relations; ability to raise funds; and excellence in management. After extensive interviews with the Board, and presentations before ICIMOD staff, the Board of Governors selected Dr. Andreas Schild as the next Director General (see box, next page). Dr. Schild will join ICIMOD in the second half of the March 2007.



The 36th Board of Governors meeting, July 2006, ICIMOD Headquarters, Kathmandu

The Fourth Quinquennial Review was carried out by a panel of four experts: Dr. Andreas Schild, Dr. Gunter Schmidt, Dr. Linxiu Zhang, and Dr. R.S. Tolia. The panel visited partners and stakeholders in regional member countries, met with staff, and studied the various documents before preparing the evaluation report. A preliminary report was shared with the staff prior to the special Board meeting. At the time of the special Board meeting, the Board members were provided with a copy of the draft report, and staff and Management provided their response to the Board and the QQR team.

Tika Gurung, tgurung@icimod.org

Future Director General of ICIMOD selected

Farid Ahmad



ICIMOD Director General designate, Dr. Andreas Schild, being interviewed by Pakistan National Television (PTV)

Dr. Andreas Schild (Switzerland) is a development specialist with over 30 years of experience in designing, planning, executing, and monitoring cooperation programmes, mainly in sustainable natural resource management. His management experience includes being Country Director of Swiss Development Cooperation in Nepal and Rwanda/Burundi; Executive Director of Intercooperation, a major Swiss NGO; and Chief Technical Advisor in North Korea for the UNDP aid coordination programme. Currently he is the team leader of the Oversight Consultant of the National Solidarity Programme (NSP) in Afghanistan. He has experience in the Hindu Kush-Himalayan region (Nepal, Bhutan, India, and Pakistan). Dr. Schild has a Ph.D. in History and Sociology from the University of Berne in Switzerland.

2006 ICIMOD Board of Governors

Regional Board Members

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

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

Mr. SK. A.K. Motahar 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 Khin Maung Zaw
Pro-rector
University of Forest
Forest Department
Myanmar

Dr. Jagadish Chandra Pokharel
Vice Chairperson
National Planning Commission
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

Dr. Elke Förster
Head of Section
Promotion of Agriculture and Food
Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Germany

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

37th Meeting of the ICIMOD Board of Governors

Meetings of the ICIMOD Board of Governors (BoG), ICIMOD Support Group (ISG), BoG Finance Committee, and BoG Programme Advisory Committee were held in Swat, Pakistan, from Friday 3rd to Sunday 5th November 2006. The meetings were preceded by a ceremonial opening on 2nd November of ICIMOD's new country office in Islamabad (see Box), and followed by a meeting of the ICIMOD Foundation in Islamabad on 6 November, and exposure field trip visits.

Intense preparation, planning, logistics, and other support, especially from the outgoing Chair of the Board Mr. Muhammad Ismail Qureshi, Dr. Farooq Ahmad, Coordinator of ICIMOD's beekeeping programme, Dr. Farid Ahmad, ICIMOD's M&E specialist, Mr. Muhammad Ismail, ICIMOD rangeland specialist, and many others helped to provide a relaxed and supportive atmosphere and ensure the success of the meetings. The location in the beautiful Swat Serena Hotel in the town of Saidu Sharif provided all that was needed to facilitate the intense and productive discussions that provide the framework for ICIMOD's activities in the coming and future years.

Participants were introduced to the impressive landscape of North-West Frontier Province (NWFP) during the drive from Islamabad to Saidu Sharif in Swat. A warm reception to NWFP en route by the NWFP Ministry of Agriculture at Mingora, Swat District, provided the perfect start to the meeting. The hosts not only generously provided excellent and much needed refreshment, they had also prepared a wonderfully detailed natural model on the banks of the River Swat showing various aspects of the integrated water management programme, and a special exhibition with produce from the government research station and information on the livestock development programme. The exhibition was formally opened by Dr. Anne Whyte, Vice-Chair of ICIMOD's Board of Governors and Chair of the Programme Advisory Committee.



Xu Jianchu

The 37th Board and ICIMOD Support Group participants meeting, November 2006, Swat, Pakistan

A poster session held after arrival in Saidu Sharif provided a platform for in-depth discussions between Programme Managers and members of the Board and Support Group. ICIMOD's incoming Director General, Dr. Andreas Schild, presented an overview of the main findings of the Quinquennial Review Report prior to the meeting, and summarised the results of a consultation on the key messages of the report and the implications for future planning held with ICIMOD staff in October. Dr. Schild took part in the subsequent Board meeting as an observer, ensuring that he will be well briefed when he takes up his new appointment in March. Presentations from two of ICIMOD's partners in Pakistan Dr. Rakshan Roohi, Water Resources

Research Institute, and Mr. Khalid Hussein, Innovative Poverty Reduction Programme, helped provide more familiarity with the types of programmes that ICIMOD undertakes and their long term impact both nationally and locally.

Meetings of the Finance Committee, Programme Advisory Committee, and ICIMOD Support Group prepared the ground for the Board meeting itself. Mr. Muhammad Ismail Qureshi from Pakistan, Outgoing Chair, welcomed the participants to the meeting. Eng. Ghulam Mostafa Jawad from Afghanistan was then elected the new Chairperson. The new Chair welcomed the newly nominated Board Members Mr.

ICIMOD inaugurates country office in Pakistan

ICIMOD's new country office in Islamabad was inaugurated on November 2nd by the Pakistan Federal Minister of Food, Agriculture and Livestock, Sikandar Hayat Khan Bosan, and Board Chairperson Mr. Muhammad Ismail Qureshi, Secretary MinFAL. Participants in ICIMOD's Annual Board and Support Group meetings attended the ceremony together with guests from the Pakistan Agricultural Research Council and National Agricultural Research Centre (NARC) and other ICIMOD partners in Pakistan. The office is located in the Water Resource Research Institute building at NARC, Chak Shahzad, Islamabad. Dr. Inayatullah Chaudhry has been selected as the Regional Programme Coordinator at the Pakistan Office and will take up his new assignment in December.

ICIMOD is confident that the Pakistan national office will further strengthen ICIMOD's regional programme by forging strong links with institutions in Pakistan, facilitating information exchange, and providing a base for furthering cooperation between Pakistan and ICIMOD's other regional member countries. On this occasion, ICIMOD also gave more than 900 publications for the country office.



ICIMOD Board Chair Muhammad Ismail Qureshi and Pakistan MinFal Minister Sikandar Hayat Bosan lead the inauguration ceremony

J. Gabriel Campbell

SK A. K. Motahar Hossain, Secretary, Ministry of Chittagong Hill Tracts Affairs, Bangladesh, U Khin Maung Zaw, Pro-rector, University of Forestry, Myanmar, and Dr. Jagadish C. Pokharel, Vice-Chair of the National Planning Commission, Nepal. This was also a meeting of farewells: the 10th and last Board meeting for ICIMOD's Director General, Dr. J. Gabriel Campbell, and the last meeting for the long-serving Board Member and Vice-Chair, Dr. Anne Whyte.

The main focus of the meeting was on the development in 2007 of a new strategic plan for ICIMOD's next phase from 2008 to 2012 – in addition to regular items such as the discussion and approval of ICIMOD's progress report for 2006 and plans for 2007. The Quinquennial Review Report, whose recommendations were discussed and accepted by the Board, provides a guide for the future plans. The process of developing a new strategic plan will continue in stages through much of 2007, and will include extensive consultations with governments and institutions in ICIMOD's regional member countries, as well as with potential funding partners. The Board will support ICIMOD through an ad hoc sub-committee of the Programme Advisory Committee that will be established expressly for this purpose.

During the meeting, Board members from ICIMOD's regional member countries expressed their overall satisfaction with ICIMOD's activities, while expressing a desire for increased activities and collaboration as well as an increased alignment of

ICIMOD's programmes with national priorities. A number of members emphasised the importance of understanding ICIMOD's role and keeping expectations appropriate. Members were reminded that ICIMOD is not a funding organisation, rather it is focused on knowledge development and dissemination. ICIMOD should demonstrate success at the pilot scale – countries had the responsibility for scaling up. There was appreciation for the broadening of the base of ICIMOD through the establishment of national committees or offices. The countries were also committed to increase support, both budgetary and beyond. Further, there was an increased need and role for ICIMOD to play as a platform for countries working together, bilaterally and multilaterally.

Three new Independent board members were appointed for the coming year. Dr. Jacqueline Ashby from UK/USA, Dr. Amir Muhammed from Pakistan, and Dr. Linxin Zhang from China. A fourth – Dr. AKM Chaudhury from Bangladesh – will take up his appointment after one year. Dr. Bruno Messerli was appointed as Vice-Chair of the Board and Chair of the Programme Advisory Committee. Participants were treated to some light relief in between meetings – a spectacular display of the traditional Khatak dance before a dinner hosted by the outgoing Board Chair, Mr. Qureshi, and a bonfire on November 5th as part of a dinner hosted by ICIMOD's Director General.

The post meeting field trip from Swat in NWFP over the mountains to Muzzafarabad in Azad Jammu



The Board of Governors meeting in Swat, Pakistan

Xu Jianchu

and Kashmir (AJK) was a timely reminder to all of the challenges faced by the mountain people of the Hindu Kush-Himalayan region, as well as a demonstration of their resilience and strength. The steep slopes of NWFP show clear signs of successful afforestation activities, the lush valley bottoms are a monument to successful indigenous and modern irrigation practices, and the group passed major construction areas focused on expansion of hydropower capacity. But the roads remain challenging, and agricultural activities are evident on dizzying slopes and in poorly accessible nooks and crannies. As the group approached Muzaffarabad, the traces of last year's major earthquake became increasingly evident. But in amongst the destruction, there is much hope and determination to rebuild livelihoods. Along the way, the group were welcomed by staff of the Swiss Development Cooperation/InterCooperation funded Innovative Poverty Reduction Programme (IPRP) in Shangla District, which is focusing on rebuilding livelihoods through activities like supporting goat keeping and providing seed with fertiliser. Dr. Thomas Hofer from the Food and Agriculture Organization and

member of ICIMOD's ISG, spoke to farmers gathered for the seed distribution about the importance of their activities. The ICIMOD group was welcomed in Muzaffarabad by the Secretary of the AJK Ministry of Agriculture. A presentation by the State Earthquake Reconstruction and Rehabilitation Authority (SERRA) provided an overview of rehabilitation activities and plans before a walk through the worst hit areas of the old town. Many people must still live in tents or temporary shelters, children attend tent schools, and whole areas have been cleared of rubble and await new construction, while many houses stand damaged and empty, mute witness to the past destruction. But evidence of activity is everywhere, showing the incredible resilience and will of these mountain people.

This thoughtful end to a successful meeting highlighted again the ideas that led to ICIMOD's foundation, and the need for and potential of an institution devoted to acquisition, dissemination, and exchange of knowledge to support mountain development. *(More pictures on the back cover).*

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Inauguration of the ICIMOD-China National Committee Secretariat

The Secretariat of the ICIMOD-China National Committee was inaugurated at a grand function on the 40th Anniversary (October 20, 2006) of the Chengdu Institute of Mountain Hazards and Environment (IMHE). This marks a new milestone in cooperation between China and ICIMOD. The Secretariat was inaugurated jointly by Dr. Fu Bojie, Director General of the Bureau of Science and Technology for Research and Environment, and Dr. J. Gabriel Campbell, Director General of ICIMOD.

Also present were Mr. Wang Zhengyu, Head of the Division of International Organisation, CAS; Professor Deng Wei, Director, and Professor Cheng Gengwei, Deputy Director, IMHE; and Prof. Xu Jianchu, Programme Manager, Water, Hazards and Environmental Management (WHEM), ICIMOD; together with 25 representatives of sister institutions, CAS Headquarters, and distinguished guests from the Sichuan Provincial Government.

Hosted by the Institute of Mountain Hazards and Environment, an active collaborating partner of ICIMOD, the establishment of the National Committee will contribute to strengthening collaboration between ICIMOD and Chinese partners, as well as between China and other regional member countries. It will aim to foster integration of Chinese institutions engaged in studying mountain issues with ICIMOD as well as build linkages with other regional and international organisations. Dr. Campbell also gave a thought-provoking talk entitled, 'Mountain environmental management: Do we have new models for research and action?'



Inaugurating a milestone in cooperation between China and ICIMOD. On the occasion, ICIMOD donated more than 800 publications to the Secretariat through the Director of the Chengdu Institute of Mountain Hazards, Mr. Deng Wei.

Yan Zhaoli

Planning the future of ICIMOD

ICIMOD began the process of identifying contemporary issues in mountain development, emerging opportunities, and partner expectations of ICIMOD Programmes that will shape the future and thus, the future direction of ICIMOD.

During a three-day planning exercise in mid-October, ICIMOD Management including the Director General, the Director General-designate, the Deputy Director General-Programmes, the Director of Administration and Finance, as well as the programme managers, action initiative coordinators, and other staff members, worked in small group and plenary sessions to collectively ponder the future challenges and ICIMOD's continuing development relevance.

The exercise – the start of an ongoing process to begin formulating ICIMOD's strategy for the next Medium Term Action Plan (MTAP) 2008/2012 – was also an opportunity to interact with the incoming Director General, Dr. Andreas Schild. Dr. Schild presented the key findings of the Quinquennial Review (QQR), of which he coincidentally was a key member. He considered the QQR recommendations as one of the building blocks, among others, to consider in shaping the new strategy in the next medium term planning.

Reflecting on the implications of the QQR findings, RMC and partners' feedback, and ICIMOD's own learning, and what the staff participating in the exercise saw as trends and challenges facing mountain development in the next five years, and considering ICIMOD's strengths and core competencies, working groups brainstormed on strategies that should feed into drawing the blueprint for the next MTAP. Some of the trends noted that will influence the future include a) globalisation, b) continuing poverty and marginalisation of mountain people, c) lack of livelihood opportunities in mountain areas, d) migration to urban areas, e) rapid urbanisation with implications on environment and policy with a mountain development perspective, f) climate change and heightened risks of natural disasters where mountain people are the most vulnerable, g) changing land use patterns with impacts on food security, energy, and water supply, h) governance issues and rapidly changing institutions, amongst many others. A collective realisation is that in order to continue to leverage its limited resources and its comparative

advantage as a regional and global institution, ICIMOD must continue to work with partners, but partnerships will have to be reviewed for their strategic position and relevance. The groups see ICIMOD working closer with the regional member countries in the next phase, while continuing to keep its independence and comparative advantage as a regional and global centre providing technical and scientific information on mountain



Dr. J. Gabriel Campbell presents some future scenarios in mountain development at the start of the workshop



The output of small group sessions presented in a plenary.

development concerns. New ideas being considered include mountain development in curricula and syllabi, and strengthened partnerships with academic and research institutions for greater synergy and impact, greater focus on livelihoods, and greater inclusion of social dimensions in technical research to provide ICIMOD a 'human face'.

Through the modalities of participatory consultation planned with our stakeholders within RMCs and beyond, and a discussion and development process within the Centre, ICIMOD hopes to continue this iterative process that should guide the drafting of a new strategy and Medium Term Plan.

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Policy priorities for sustainable mountain development

A three-day regional workshop on Policy Priorities for Sustainable Mountain Development was held in Kathmandu from 18-20 September. The objectives were to share the lessons, experiences, and good practices gained through work carried out by ICIMOD and its partners in developing common understanding and vision vis à vis mountain policy issues, options, and priorities.

Forty-five participants from seven regional member countries of ICIMOD representing governments, NGOs, civil society, research and development organisations, and universities participated in the workshop. Representatives from international research and development organisations, including FAO and UNDP, also participated. Dr. Jagdish Chandra Pokharel, Vice Chair, National Planning Commission, Nepal, inaugurated the workshop.

Seven plenary sessions were devoted to seven thematic aspects of sustainable mountain development: mainstreaming mountain policies, management of vulnerable mountain natural resources, promoting regional and local conservation of mountain biological and cultural heritage, increasing the incomes of rural mountain people, reducing physical vulnerability within watersheds and regional river basins, promoting greater voice and social equity, and improving policy-making processes. Four working groups were formed to develop recommendations for improving policy formulation and implementation processes; strengthening regional cooperation; reducing poverty,

inequality, and vulnerability; and suggesting ways and means to improve ICIMOD's policy work.

The key recommendations made at the workshop by each group are summarised as follows.

- Recognise policy as a process and the many actors and factors involved in the processes at different stages. ICIMOD can play an important facilitating role through generation and dissemination of data, information, knowledge, understanding, technology, and good practices to raise awareness about policy issues that are critical for mountain people to facilitate informed decision-making.
- Make efforts to mainstream mountain issues at national, regional, and international fora.
- Form a Policy Analysis Group at ICIMOD and a National Policy Working Group in the eight regional member countries with strategic partners to foster demand-driven policy research and analysis, to feed into policy processes.
- Carry out inter-country studies and exchange visits to facilitate cross-country learning.
- Develop linkages and build partnerships with national organisations involved in policy research as well as with global research and development partners to promote mountain agenda.
- Document and disseminate good practices and approaches and disseminate them in the regional member countries to facilitate their adoption.
- Identify areas for regional cooperation.
- Strengthen regional cooperation and support institutional development for sub-regional/river basin approaches; e.g., basin organisation.
- Strengthen communication through e-networks, seminars, symposiums, and other media and fora.
- Involve civil society and other key stakeholders and support them through knowledge and information to promote multi-stakeholder policy-making processes.
- Institutionalise monitoring and evaluation of policies to provide feedback to policy-makers and other key stakeholders.

Golam Rasul, grasul@icimod.org



Narendra Bajracharya

A plenary session of the policy workshop

New Board Members

ICIMOD is pleased to have on its Board of Governors, the following new Board members.

Elke Förster, Independent Board Member,
Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, Germany

Dr. Elke M. Förster from Germany joined as an Independent Board Member from July 2006. Dr. Förster's appointment was approved during the Special 36th Meeting of the ICIMOD Board of Governors' held in Kathmandu, Nepal in July. An agricultural economist by profession, Dr. Förster is currently the Head of Section on Promotion of Agriculture and Food of the German Agency for Technical Cooperation (GTZ) based in Eschborn, Germany.

Dr. Förster's professional work has focused on Asia including China, India, Indonesia, Korea, Laos, and Vietnam. She did her Masters in Agriculture at TU Berlin in 1988, and obtained her Ph.D. in Agricultural Economics from the University of Hohenheim, Germany in 1994. She will serve for a term of three years and join the Finance Committee.



SK. A.K. Motahar Hossain, Regional Board Member, Bangladesh,
Secretary, Ministry of Chittagong Hill Tracts Affairs

Mr. SK. A. K. Motahar Hossain is from Gazipur, in central Bangladesh, and has a B.A. (Hons) and M.A. in Political Science from Dhaka University. He commenced his career as a political science teacher in April 1975, and joined Bangladesh Bank a year later, where he served as Assistant Director of the Foreign Exchange Department until February 1979.

He joined the Civil Service of Bangladesh in March 1979, and since then has served in various official capacities including, Director of the Directorate of Commercial Audit from 1986-89; Director of the General Education Project from 1993-96; Deputy Secretary in 1998, working in the policy process of the Government of Bangladesh overseeing project financing. He served as Deputy Secretary in the Ministry of Finance (Finance Division) from 1998/2000 and in the Ministry of Education as both Deputy

Secretary and Joint Secretary from 2001/2003 and was involved in Food Planning and Monitoring as Director General of the Food Planning and Monitoring Unit in the Ministry of Food and Disaster Management. Mr. Hossain also served as Additional Secretary in the Economic Relations Division of the Ministry of Finance, responsible for aid negotiations with the World Bank and Japan as well as for overall foreign debt management. He assumed his current post of Secretary, Ministry of Chittagong Hill Tracts' Affairs on 10 July 2006. Mr. Hossain has undertaken additional training courses inside and outside Bangladesh – in the UK, USA, and India. His work has taken him to countries in Southeast Asia, the Middle East, and Africa.



Jagadish Chandra Pokharel, Regional Board Member, Nepal
Vice Chairperson, National Planning Commission, Nepal

Dr. Jagadish Chandra Pokharel, Honourable Vice Chairperson of the National Planning Commission, Government of Nepal, is the most recent addition to ICIMOD's Board. Dr. Pokharel was confirmed as Board member representing the host country, Nepal, during the 37th ICIMOD Board of Governors meeting in Swat, Pakistan in early November 2006.

Dr. Pokharel joins the Board with his broad mountain development experience. He has done consulting work for international organisations such as

UNDP, World Bank, ADB, and USAID, and is a former member of the National Planning Commission, where he initiated policy initiatives in decentralised governance and sustainable development. He has traveled extensively in 65 of Nepal's 75 districts in the course of work, and abroad including in the US, UK, Japan, Cambodia, Pakistan, India, Bangladesh, Philippines, and other European countries. He also actively served as a member, chairman, or coordinator



in several national committees, commissions, and task forces of the Government of Nepal.

Apart from his professional development pursuits, Dr. Pokharel teaches Regional Development Planning at the Institute of Engineering in Pulchowk, Lalitpur, and is an active member of several professional planning and development associations in Nepal and abroad. He is also involved in several local level conservation activities in Nepal and has written a book on conflict and negotiations on natural resources entitled, *Environmental Resources Negotiations*

Between Unequal Powers published by Bikas Publications, Delhi. He has also published in international journals and writes for several Nepal national dailies and weekly magazines on a variety of development subjects and issues.

Dr. Pokharel has a Ph.D. in Regional Development Planning from the Massachusetts Institute of Technology (1991), a Master's degree in the same field from the University of Hawaii, Manoa (1985); and a Bachelor of Architecture degree from the University of Thessaloniki, Greece.

U Khin Maung Zaw, Regional Board Member, Myanmar **Pro-rector of the University of Forestry**

U Khin Maung Zaw, currently Pro-rector of the University of Forestry, Forest Department, Yezin, Myanmar, is the new Board Member from Myanmar. His appointment was confirmed, along with that of Dr. Pokharel of Nepal, during the 37th ICIMOD Board of Governors' meeting in Swat, Pakistan.

U Khin Maung Zaw has more than three decades of work experience in conservation and management of the ecosystem in Myanmar. His interests are varied and lie in the conservation of biological diversity, management of wildlife and protected area systems, wetland conservation and management, environmental education, and research on biodiversity conservation. He has worked in various capacities with both national

and international organisations based in Myanmar and in Austria, Japan, and USA. He was also one of the leading persons in seeing to the implementation of Myanmar's obligations under the Convention on Biological Diversity (CBD) and was the recipient of the Abraham Conservation Award, presented by the Wildlife Conservation Society (WCS), Myanmar Programme in 2005.

U Khin Maung Zaw received his Master's degree in Science in Resource Management from the Edinburgh University, UK in 1984, and his B.Sc. (Forestry) from the Art and Science University of Yangon, Myanmar in 1974.



New Memoranda of Understanding and Agreements Signed with Partners **May-October 2006**

June 2006	Tibet Autonomous Region Erosion Department, Lhasa and Integration Energy and Environment GmbH, Graefenberg, Germany for Improving GIS and RS capacity
June 2006	Ministry of Environment, Science, and Technology (MoEST) for Phase III – Malé Declaration
July 2006	Ministry of Environment, Science, and Technology (MoEST) and UNEP Regional Resource Centre for Asia-Pacific for Phase III implementation of the Malé Declaration
July 2006	Afghanistan Information Management Systems (AIMS), UNDP for GIS
July 2006	Intercooperation-Pakistan for natural resource management and rural income diversification
July 2006	Beekeepers' Association of Bhutan (BEKAB) for promoting partnerships with rural development organisations and networks in the HKH
August 2006	Council for RNR Research of Bhutan – Ministry of Agriculture (CoRRB-MoA) for promoting partnerships with rural development organisations and networks in the HKH
August 2006	United Nations Environment Programme, Regional Resource Centre for Asia and the Pacific (UNEP, RRC.AP) for the preparation and organisation of sub-regional and national workshops in Kathmandu, Nepal
September 2006	Socioeconomic, Agro Forestry, and Environmental Concern for 'Livelihood Enhancement through Commercialisation of Valuable Medicinal Plants and other Non-timber Forest Products'
September 2006	The Asia Regional Office of The World Conservation Union (ARO-IUCN) for 'Institutional Consolidation for Coordinated and Integrated Monitoring of NR towards Sustainable Development and Environmental Conservation in the HKH -Karakoram-Himalaya Mountain Complex'
September 2006	National Centre of Excellence in Geology (NCEG), University of Peshawar for a national training course in Pakistan

Research updates and project news

Networking for development: MAPPA launched in China

The Medicinal and Aromatic Plants Programme in Asia (MAPPA) has, in a span of eight years, evolved as a flagship programme for strategic research, multiple donor collaboration, and national, regional, and global networking in medicinal and aromatic plants. The programme has a holistic approach to research and supports activities that integrate biodiversity conservation, primary health care, sustainable livelihoods, and gender equity. MAPPA strives to ensure that its action-oriented research informs both national and regional policies and that there are tangible livelihood and conservation-related impacts for local-level stakeholders.

After devolution of MAPPA to ICIMOD by the International Development Research Centre (IDRC), Canada, one of the main goals was to launch and introduce the MAPPA network in the regional member countries, including Afghanistan, China, and Myanmar. The China MAPPA was launched in August 2006. ICIMOD collaborated with the Kunming Institute of Botany and the Chinese Academy of Sciences to organise a two-day workshop from 31st July to 1st August 2006, preceded by a three-day field visit to Chu Xiaiong, Dali, and Lijiang prefectures in Yunnan Province, South-west China from 28-30 July.

High-level participants from ICIMOD RMCs included Dasho Dawa, Director General, Department of Forests, Ministry of Agriculture and Mr. Raling Nawang Drukdra, Director, Royal Botanical Park, Department of Forests, from Bhutan; Mr. B. S. Sajwan, Chief Executive Officer, National Medicinal Plants' Board, Government of India; and Mr. H.K. Saiju, Director General, Department of Plant Resources, Ministry of Forests and Soil Conservation, Government of Nepal, and Prof. R.P. Chaudhary, ex-ICIMOD Board member, from the Central Department of Botany, Tribhuvan University, Kathmandu, Nepal. There were three participants from ICIMOD-MAPPA and 25 participants from China.

Objectives of the workshop

The workshop introduced MAPPA and launched the China MAPs-Net, and aimed to generate a better understanding of issues emerging in the medicinal and aromatic plants sector related to traditional knowledge, ongoing initiatives, and different actors and institutions involved in defining the China MAPs-Net project. The workshop established a China MAPPA Network

Coordination Committee to generate partnership projects between ICIMOD - MAPPA, national institutions, and regional member countries and facilitate linkages between research and national policy and development through flexible, responsive, and locally adaptive implementation frameworks.

Opportunities for regional collaboration

Keeping in mind the strengths of traditional Chinese medicine (TCM) and availability of ample resources in the form of wise practices, technologies, institutional innovations, regional member countries can enter into mutually acceptable partnerships for sector development in the region.

The following are among the issues discussed at the workshop.

Cross border conservation and trade: to enable a legal flow of quality products across the borders of Bhutan, India, and Nepal to China. Many species are common to these countries and MAP-based companies in China can have an assured supply of raw materials.

Joint research: covering different aspects of MAP conservation, commercialisation, technology development, and traditional medicines.

Marketing of traditional medicines: to explore the possibilities of marketing herbal products from different countries.

Transfer of technology: covering GAP, processing, and value addition, as well as quality control and standardisation.

Study and exposure tours: to visit different institutions, sites, and companies and learn from China's experience.

MAPPA could take the lead in developing such linkages through its research projects or through facilitating institutional linkages among country networks.

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An array of medicinal and aromatic plants

Dyutiman Choudhary

Workshops, meetings and training courses

3rd and 4th Quarter 2006

Satellite rainfall estimation for flood forecasting and drought monitoring

Floods and droughts are common natural hazards in the HKH region. Accurate estimates of rainfall are needed to minimise the impact of floods and droughts. Until recently, the main method used to estimate the amount of rain falling in an area was interpolation of measurements from a network of hydrometeorological stations: the closer the spacing between stations, the

rainfall estimate model specifically for the Himalayan region by refining a system developed by the National Oceanic and Atmospheric Administration (NOAA) Climate Prediction Centre and to test a streamflow model (GeoSFM) developed by the United States Geological Survey (USGS) for flood-hazard monitoring. This project has been designed to support country implementation plans developed during a regional workshop on satellite rainfall estimation organised by ICIMOD in 2005. The project is funded by the United States Agency for International Development, Office of US Foreign Disaster Assistance (USAID/OFDA).

As part of the project a five-day inception/ training workshop was held at ICIMOD from 3-7 July 2006, with resource persons from NOAA and USGS. Twenty participants from regional member countries participated in the workshop and received hands-on training on the installation, theory, and processing of rainfall estimation (RFE) software, GeoFUSE, for climate monitoring and streamflow modelling (GeoSFM), software installation, and calibration. The roles and responsibilities of partners were discussed and clarified. An action plan was prepared and agreed upon for RFE validation and GeoSFM modelling for smooth implementation of the project.

The project is expected to strengthen the capabilities of regional institutions to provide timely and accurate estimates of rainfall, hence contributing to the development of effective early warning systems and reducing the risk of water-induced disasters.

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Assessing the 'UN Decade of Indigenous Peoples (1995-2004)' in Nepal

ICIMOD, in collaboration with the Tebtebba Foundation in the Philippines and supported by IFAD, has been carrying out an assessment of the first UN Decade of Indigenous Peoples, covering ten countries in Asia. National/local consultations have been held as part of the research process. On July 20th, over 40 participants from different 'Janajati' groups, donor agencies, and government representatives

participated in a one-day consultation workshop which was organised in collaboration with the Nepal Federation of Indigenous Nationalities (NEFIN). The discussion and proceedings of the workshop will contribute to the Nepal country report on the assessment.

Radhika Gupta, rgupta@icimod.org



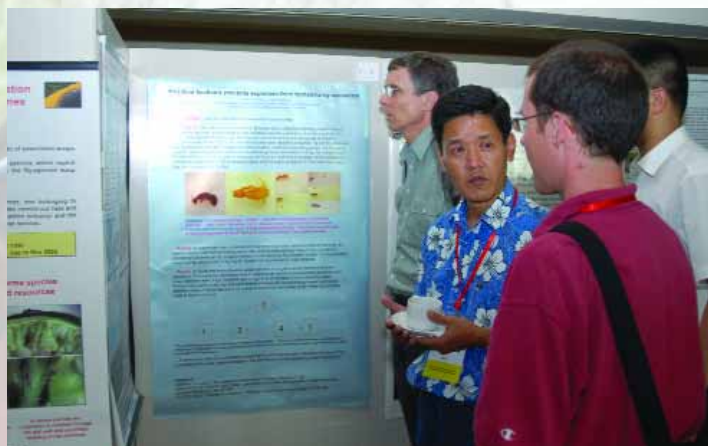
The workshop participants, July 2006

more accurate the total rainfall estimates. In mountainous areas, however, measuring stations are often sparse, and rainfall information is too unreliable for predicting floods with any certainty. In the Himalayan region, which contains the headwaters of eight major Asian rivers, this is a major obstacle to accurate flood forecasting.

To enable accurate estimates of rainfall using satellite-enhanced rainfall estimation and its applications to flood forecasting and drought monitoring ICIMOD introduced a one-year project on 'Application of Satellite Rainfall Estimates in the HKH Region'. The objectives are to develop a satellite

Annual meeting of the Association for Tropical Biology and Conservation, Kunming, China

The annual meeting of the Association of Tropical Biology and Conservation (ATBC) was held in Kunming from 18-21 July 2006. The meeting was organised by Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences (<<http://www.xtbg.ac.cn>>) in association with Kunming Institute of Botany. On the eve of the annual meeting more than 14 symposia covering various thematic areas were organised. ICIMOD, in collaboration with Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, organised a panel session on 'Land-Use, Landscape Management and Environmental Services in Mountain Mainland Asia: Trade-offs and the Design of Sustainable Land Use and Conservation Strategies'. Eleven presentations on prevailing mountain thematic areas were presented by ICIMOD participants and partners working in the region. The panel covered issues related to hydro-ecological linkages, land-use transition, environmental services, enterprise-based conservation, and the landscape approach to conservation. The panel contributed to the Kunming Declaration in which special emphasis was given to regional cooperation and integrated approaches to



A poster session supported by ICIMOD during the workshop

conservation. The Declaration "strongly suggests that reserves be linked wherever possible to regional networks and cross-national corridors, that their size and effectiveness be increased for area-sensitive wildlife, and that their vulnerability to many external threats be reduced."

for more information, visit
http://atbc.xtbg.ac.cn/DBS/ATBC2006_Kunming_declaration_en.doc

Nakul Chettri, nchettri@icimod.org

ICIMOD trains South Asian tourism organisations on project management in sustainable tourism development

As part of the South Asia Subregional Economic Cooperation (SASEC) technical assistance on human resource development and capacity building in the tourism sector, ICIMOD carried out six days of training on 'Project Facilitation and Management in Sustainable Tourism Development', in partnership with SNV (The Netherlands Development Organisation) and the Nepal Tourism Board (NTB). The training workshop was designed to improve understanding of participatory sustainable tourism planning and development and to increase a variety of skills in and informed active support to the development, implementation, management, and monitoring of sustainable tourism development projects in ICIMOD member countries. In total 24 participants from national and state tourism organisations from Bangladesh, Bhutan, Tibet Autonomous Region/China, India, Myanmar, and Nepal attended. In an evaluation of the training programme participants evaluated the training very positively, with 74% of participants rating it 'excellent' and 26% rating it 'outstanding', and the majority indicating that the training was helpful in their respective areas of work. At the end of the course, a CD-ROM of all the training materials was distributed to the participants. At the



Participants from tourist organisations in the region pose in front of the ICIMOD Headquarters building

request of the participants, and with support from the ADB, a comprehensive training manual including all the presentations, exercises, and instructions, complemented by case studies from across the region, will be published by the end of the year. In January and February 2007, ICIMOD will carry out further training in collaboration with SNV and the NTB on Sustainable Tourism Market Linkages. This will be carried out under the umbrella of the World Leisure International Centre of Excellence (WICE), Wageningen University, Netherlands.

Ester van der Blonk, evanderblonk@icimod.org

Workshop urges citizens to use 'right to information' to seek environmental justice

ICIMOD has been conducting legal literacy training workshops through its programme on 'Advancing Minority Rights to Environmental Justice', supported by the Ford Foundation. A training course focusing on the



Sunderlal Bahuguna, a leading figure in the conservation movement in India, encourages the 'Right to Information' movement

'Right to Information Act' (RTI) in India and the Environmental Impact Assessment regulations was organised in Dehradun, Uttaranchal, from 10–22 August 2006 in collaboration with the Himalayan Environmental Studies and Conservation Organisation (HESCO) and the Lawyers' Initiative for Forests and Environment (LIFE). The programme was inaugurated by Shri Sunderlal Bahuguna who stressed the importance of mountain regions joining hands to assert the particular needs and predicaments of developmental change in mountain areas. Dr. R.S. Tolia, the Chief Information Commissioner of Uttaranchal, closed the workshop, responding to the queries of participants on the practical issues of implementation of the RTI and urging citizens to use it as a tool to seek environmental democracy and justice.

Radhika Gupta, rgupta@icimod.org

UNEP mission to ICIMOD

ICIMOD and the United Nations Environment Programme (UNEP) Regional Resource Centre Asia Pacific (RRC.AP) have several memoranda of understanding on collaborative projects. To implement the agreed programmes, several national and sub-regional events were organised in Kathmandu from 21 August to 1 September 2006. These were: the consultations on draft preparation of the Kathmandu Valley City IEA/State of Environment (SoE) report, and training on environmental management tools.



The UNEP mission at ICIMOD, August 2006

UNEP, in partnership with other collaborating centres also organised subregional activities and consultations on the sub-regional sustainable development strategy (SSDS), an inception cum training workshop on preparation of the South Asian Environment Outlook (SAEO); and a technical workshop for the development of an environmental knowledge hub (e-KH) for the Asia-Pacific region. Mr. Surendra Shrestha, Regional Director and Representative, UNEP Regional Office for Asia and the Pacific (UNEP ROAP); Dr. Subrato Sinha, Environmental Affairs' Officer, UNEP ROAP; Mr. Purna Chandra Lal Rajbandari, Senior Programme Officer, Regional Resource Centre-Asia Pacific, UNEP RRC.AP; and Dr. Aida N. Karazhanova, Programme Officer, Capacity Building, UNEP RRC.AP were at ICIMOD from 20 August to 1 September 2006 for these meetings.

Bidya Banmali Pradhan, bbanmali@icimod.org

Two-week training course on erosion assessment and control

A letter of agreement between ICIMOD and the Tibet Autonomous Region (TAR) Erosion Department, Lhasa was signed on July 2006 to carry out a two-week training course on 'Application of Geo-informatics for Erosion Assessment and Control' for the TAR Erosion Department in Lhasa. Three interns from the department were at ICIMOD from 24 August to 9 September 2006 to prepare datasets, GIS training

materials, and case studies on TAR/China for this course. Mr. Sushil Pradhan, coordinator of the course, and Mr. Lokap Rajbhandari were in Lhasa from 12 to 22 September to conduct the training. The funds for this course were provided by the Integration Energy and Environment GmbH, Graefenberg, Germany.

Sushil Pradhan, suspradhan@icimod.org

A network for diversifying knowledge sharing to rural and remote communities in South Asia

A workshop was sponsored by ICIMOD and organised jointly by ICIMOD and Madan Bhandari Memorial Academy in Urlabari, Morang, Nepal from 15-18 August 2006 as a first step in building a network of institutions at community levels to produce and share multimedia/multilingual training and awareness-raising materials relevant to local issues and needs. Ten participants from five organisations took part in the workshop – four from North-east India and six from Eastern Nepal.

The overall goal was to establish a network of institutions interested in producing and sharing multimedia/multilingual training materials. It is a challenge to transfer information and knowledge to people in such a way that they can use it to solve their problems. The use of multimedia (text, voice, photo, video) to present properly structured information was the method used in this workshop to facilitate knowledge transfer.

The workshop focused on how knowledge delivery and sharing can be carried out using multimedia. Introduction to multimedia concepts and familiarisation with multimedia hardware and software through presentations, discussions, hands-on practice, and group work with real case examples took place. For the group work, the topics were chosen in consultation with participants. Sample presentations were developed in the following.

- Rural agriculture-marketing
- Beekeeping – queen rearing
- Community-based biodiversity conservation
- Integrated livestock management
- Livestock temperature measurement

Workshop participants found the workshop useful as it was based on the novel idea of using education

RMC partner exchanges

Mr. Lakpa Tashi, Mr. Gong Kui Fang, and Ms. Tseyang Lhamo from the Erosion Department, Lhasa, Tibet Autonomous Region (TAR), PRC were at MENRIS from 24 August to 2 September 2006 to assist in preparing datasets, GIS training materials, and case studies on TAR/China for the training course on



Field application sessions

and entertainment to deliver knowledge to communities. Visual and audio materials helped in understanding the subjects. The materials were discussed and prepared in people's own languages. Even a person who cannot read can gain from this method. Participants expressed the opinion that this method of delivering messages makes them more efficient. Further more, the involvement of domain experts (someone having expertise in, for example, biodiversity, beekeeping, livestock, among others) and participation and cooperation from community stakeholders and computer specialists ensure that knowledge delivery will meet the needs of the intended users and allow for corrective actions at each stage of development of a presentation.

It was agreed that a network for collaboration among like-minded institutions and people was needed for diversification of knowledge-sharing methods in the region. With this experience and examples and needs expressed by the participants and communities, a new proposal for scaling up this work, will be developed at ICIMOD.

Zbigniew Mikolajuk, zmikolajuk@icimod.org

'Application of Geoinformatics for Erosion Assessment and Control', which took place in Lhasa from 11 to 22 September 2006.

Mr. Muhammad Ali from the Centre of Excellence Geology, University of Peshawar, Pakistan was at

Share Knowledge on Disaster Preparedness!

Visit ICIMOD's recently launched web-based Knowledge Sharing Platform:

www.disasterpreparedness.icimod.org

Initiative funded by the Humanitarian Aid Department of the European Commission (DG ECHO)



MENRIS from 5 October to 5 November 2006 to prepare and organise a national training course on 'Earthquake Vulnerability Multi-Hazard Risk Assessment' under the EC-DGECHO project

scheduled to take place in Pakistan from 13-24 November 2006.

Monica Moktan, menris@icimod.org

Phase III Malé Air Pollution Project holds 8th Session

The Regional Stakeholders cum Regional Coordination meeting and Eighth Session of the 'Intergovernmental Meeting on the Malé Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects for South Asia', carried out under Phase III of the Malé Declaration took place in Thimphu, Bhutan, from 12 - 13 September 2006. The objective of the meeting was to increase awareness of transboundary air pollution, share and receive stakeholders' views and ideas about the implementation of the Malé Declaration, and improve information exchange between information generators

and users. It also intended to review air pollution initiatives in South Asia by the intergovernmental meeting of the Malé Declaration, and improve coordination and sharing of information among the ongoing initiatives on air in the region and in other regions. The intergovernmental meeting included review of regional level and national implementation plans, the technical manual, the data report 2006, and improvement of information exchange among countries participating in the follow-up actions to the Malé Declaration.

Bidya Banmali Pradhan, bbanmali@icimod.org

ICIMOD mourns the loss of partners and friends in the helicopter crash in Nepal

The ICIMOD and Mountain Forum family mourns the loss of esteemed and valued partners and friends, giants in the conservation movement, in a helicopter crash in the mountains of Taplejung district, eastern Nepal, on Saturday, 23 September 2006. The accident resulted in irreplaceable loss to the nation and the world. Twenty eminent sons and daughters, scholars and development workers of Nepal, along with foreign dignitaries and development practitioners and four crew members were lost on this day.

We are deeply saddened by this tragedy. Almost all of the people on board were close friends, work colleagues, and partners of many of us at ICIMOD. Some of them had served as members of our Board of Governors, project managers, and key partners in a number of joint efforts to help improve the livelihoods and ecosystems of the Himalaya. We share our profound grief and sorrow with their families, colleagues, and friends throughout Nepal and the world.

A memorial service was held at ICIMOD to pay our last respects to their departed souls.

The list of those lost on this day includes the following.

Acharya, Bigyan, Program Development Specialist, USAID
Alexander, Margaret, Deputy Director, USAID
Bhandari, Hem Raj, Nepal Television
Bowling, Jill, Conservation Director, WWF UK
Gurung, Chandra, Country Representative, WWF-Nepal
Gurung, Harka, Advisor, New Era, Ex-Board of Governors, ICIMOD
Headley, Jennifer, Coordinator, WWF UK
Lama, Yeshe, Senior Programme Officer, WWF Nepal
Maskey, Tirtha Man, Co-chair, AsRSG
Mustonen, Pauli, Chargé d' Affairs, Embassy of Finland
Parajuli, Damodar Prasad, Acting Secretary, Ministry of Forests and Soil Conservation
Poudel, Narayan, Director General, Department of National Parks and Wildlife Conservation
Preece, Mathew, Program Officer, WWF US
Rai, Gopal, Minister of State for Forests and Soil Conservation,
Rai, Meena (wife of Minister Mr. Gopal Rai)
Rai, Sharad, Director General, Department of Forests
Singh, Sunil Kumar, Nepal Television
Sherpa, Dawa Tsering, Chairperson, KCAMC
Sherpa, Mingma Norbu, Managing Director, EHEC, WWF US
Shrestha, Vijaya, Central Committee Member, FNCCI

J. Gabriel Campbell, gcampbell@icimod.org

Global Mountain Forum Secretariat

European Mountain Forum legally registered in Savoie, France

Thanks to the leadership and initiative of Dr. Martin Price, Chair of the European Mountain Forum (EMF) Board, the EMF legal registration process in Savoie (France) has been completed. The Mountain Forum Secretariat appreciates the support provided by Dr. Price and the authorities of Savoie in this process, which will ensure the continuation of regional operations of the Mountain Forum in Europe in collaboration with the Mountain Forum Secretariat and its regional nodes in Africa, Asia, North America, and Latin America.

Mountain Forum invited to the Adelboden Group Bureau meeting in Rome, Italy

In response to the kind invitation of the Adelboden Group Chairman, Min. Miguel Palomino, Mountain Forum's Executive Secretary, Dr. Ana Maria Ponce, represented Mountain Forum at the Adelboden Bureau meeting in Rome from 13-14 November 2006. Dr. Ponce discussed the potential for collaboration between Mountain Forum and the Adelboden Group, which is a global initiative promoting Sustainable Agricultural Research and Development (SARD) in mountain regions, sponsored by the Swiss Ministry of Agriculture, France, and Japan.

Mountain Forum and ICIMOD attend regional mountain associations meeting in Himachal Pradesh, India

Following the invitation of Mr. Nicolas Krausz, Director General of the World Mountain People's Association (WMPA), Ms. Celine Curi from MFS and Ms. Tara Dhakal from CEGG represented Mountain Forum and ICIMOD, respectively, at the WMPA regional meeting in Sairopa, Himachal Pradesh, from 10-15 October 2006. The mandate of WMPA is to support indigenous mountain communities around the world and to help give them a voice. WMPA is organising regional stakeholder meetings in the Andes, Africa, Europe, and the Himalayas. The outcomes from these meetings will be presented to global policy-makers at an Inter-ministerial meeting to be held in France in December 2006.



The Mountain Forum Secretariat staff, 2006

Mountain Forum collaboration with MRD

Mountain Forum provided support to the *Mountain Research and Development Journal* by launching a survey among MRD readers, reviewers, and subscribers on the occasion of MRD's 26th year of publication.

Online library's new feature

A new tool has been added to the MF Online Library through which users can have full text documents sent to them or others via email rather than downloading copies.

Mountain Forum Calendar revamped

The Mountain Calendar, maintained jointly by the Mountain Forum Secretariat and the Mountain Partnership Secretariat-FAO, has undergone many improvements over the last few months. To publish events on the Mountain Calendar or browse past and upcoming mountain events, please visit:

<http://www.mountainpartnership.org/events/default.asp>
or contact: calendar@mtforum.org

New member of the Mountain Forum Secretariat team

Mountain Forum is pleased to announce that Ms. Elizabeth Fox has joined the Mountain Forum Secretariat team as a Programme Assistant, Information Services. Her primary responsibility will be to maintain and develop the Mountain Forum Online Library.

Mountain Forum Secretariat, c/o ICIMOD, Khumaltar, GPO Box 3226, Kathmandu, Nepal

Outreach activities

Celebrating the 'International Day of Indigenous Peoples 2006' with a new book on shifting cultivation

ICIMOD celebrated the 'International Day of Indigenous Peoples 2006' by promoting its new book, **Debating Shifting Cultivation in the Eastern Himalayas: Farmers' Innovations as Lessons for Policy** on 10 August 2006, in a collaborative effort between three ICIMOD programmes: Natural Resource Management (NRM), Culture, Equity, Gender, and Governance (CEGG), and Information Management, Communications, and Outreach (IMCO) of the Information and Knowledge Management (IKM) programme. Over forty guests from the Government of Nepal, civil society, the development community, the media, and ICIMOD attended the gathering.



Dr. Om Gurung (2nd from the right), NEFIN General Secretary listens to a presentation about the book on shifting cultivation

The practice of shifting cultivation, better described by the term 'rotational agroforestry' is inextricably linked to the culture and livelihoods of many indigenous peoples in the region, including the Chepangs in Nepal. ICIMOD's assessment is that the main achievement of the First UN Decade of Indigenous Peoples (1995-2004) has been to open the way for the issue of indigenous peoples to be more widely and openly discussed.

Guest speakers discussed how shifting cultivation practised by indigenous people in the Eastern Himalayas can be improved and adapted to present-day needs rather than replacing it with alternatives. Policies that discourage the practice, including those on land tenure and forests, have resulted in resource degradation and alienation of the poor from their resources, means of livelihood, and social security. Changing these policies will benefit the farmers and be helpful for improving food security and biodiversity conservation.

Dr. Om Gurung, General Secretary of the Nepal Federation of Indigenous Nationalities (NEFIN), was the Chief Guest. He welcomed ICIMOD's initiatives in addressing the issues of indigenous peoples.

Nira Gurung, ngurung@icimod.org

Elisabeth Kerkhoff, ekerkhoff@icimod.org

Radhika Gupta, rgupta@icimod.org

Contribution/donor news update

Pakistan contributes its second installment for the ICIMOD Headquarters

In July 2006, the Government of Pakistan handed over US\$3,492 to ICIMOD as a final installment of its contribution to the completion of the ICIMOD Headquarters building. The first installment of US\$96,841 was received last year, making Pakistan's overall contribution to the ICIMOD building US \$100,332. ICIMOD expresses its gratitude to the Government of Pakistan for this valuable contribution.

An updated list of contributors to the Headquarters' building is given in chronological order of receipt.

China	US\$ 100,000
Bangladesh	US\$ 28,300
Bhutan (estimated value of in-kind contribution)	US\$ 28,300
India	US\$ 98,718
Pakistan	US\$ 100,332
Total	US\$ 355,650
Nepal contributed 1.5 ha of land on which the ICIMOD HQ building stands (estimated value)	US\$ 1,000,000

Milan Raj Tuladhar, mtuladhar@icimod.org

ICIMOD represented at the exhibition on 'Management of Water, Wastewater and Environment: Challenges for the Developing Countries'

The Information and Knowledge Management (IKM) Programme represented by MENRIS and Information Management, Communications, and Outreach (IMCO) participated in a three-day exhibition organised jointly by Nepal Engineers' Association (NEA); Society of Public Health Engineers, Nepal (SOPHEN); Ministry of Environment, Science, and Technology (MoEST); and Ministry of Physical Planning and Works (MoPPW) as part of an international conference on 'Management of Water, Wastewater, and Environment: Challenges for the Developing Countries'. The exhibition was held at the Birendra International Convention Centre (BICC) from

13-15 September 2006 and was inaugurated by the Honourable Mr. Gopal Man Shrestha, Minister of Physical Planning and Works. He along with Honourable Mr. Gyanendra Bahadur Karki Minister of State for Water Resources visited the ICIMOD stall and showed keen interest in the information displayed at our booth. Various other participants also showed an interest in our materials, the main attraction being the high-resolution satellite imagery of Kathmandu and Lalitpur cities using the latest technology. ICIMOD publications also sold well.

Govinda Joshi, gjoshi@icimod.org

Nira Gurung, ngurung@icimod.org

New project support to ICIMOD 2006

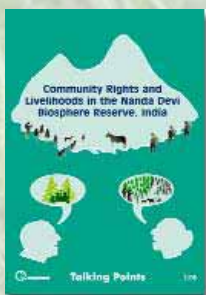
as of October 2006

ICIMOD is pleased to announce the following project grants support to the Centre.

	Donor	Project	Duration	Total Amount
1	FAO: Food and Agriculture Organization	Sustainable Agriculture and Rural Development in Mountain Regions (SARD -M, Phase II)	30 June 2006 to December 2006	US\$ 19,075
2.	SDC: Swiss Agency for Development and Cooperation	Associate Professional Officers Programme (APO)	16 February 2006 15 February 2008	US\$ 206,696
3	CFC/FAO :Com mon Fund for Commodities/ Food and Agriculture Organization	Medicinal Plants and Herbs: Developing Sustainable Supply Chains and Enhancing Rural Livelihood in Eastern Himalayas	10 May 2006 to 10 August 2010	US\$1,681,515
4	DRSP: District Road Support Programme	Training on Technical Knowledge to District Road Support Programme Participants	March 2006	US\$ 4,796
5	NTB: Nepal Tourism Board	Project Management Training for National and Local Tourism Organisations	July 2006	US\$ 29,080
6	USAID: United States Agency for International Development	Capacity Building for Flash Floods Management and Sustainable Development in the Himalayas	June 2006 to December 2007	US\$ 144,110
7	OFDA: Office of US Foreign Disaster Assistance	Follow-up activities to the Satellite Rainfall Estimation Workshop	January 2006	US\$ 100,000
8	IFAD: International Fund for Agricultural Development	Enhancing Innovative and Pro-Poor Upland Policies Programme	May 2006 to October 2007	US\$ 200,000
9	UNEP: United Nations Environment Programme	Preparation and organisation of sub -regional and national workshops in Kathmandu	August 2006 to October 2006	US\$ 50,800
10	UNEP: United Nations Environment Programme	Implementation of Malé Declaration -Phase III	12 July 2006 to October 2006	US\$ 50,800
11	CEC: Commission of the European Communities	Twinning European and South Asian River Basin to Enhance Capacity and Implement Adaptive Integrated Water Resources Management Approaches	June 2006 to May 2009	Euro 260,420
12	EC: European Commission	Living with Risk – Sharing Knowledge on Disaster Preparedness in the Himalayan Region	1 April 2006 to 30 June 2007	Euro 251,302
13	ICCO: Interchurch Organization for Development Cooperation	Capacity Building of Community -Based Organisations in Advocacy Strategies : ICIMOD 2005-2008 Indigenous Mountain Peoples Project	January 2006 to December 2008	Euro 352,500
14	IDRC: International Development Research Centre	Land-use Transition and Human Health in the Eastern Himalayas	4 February 2006 to 3 February 2007	CAD 168,900

Recent ICIMOD publications

The following are the major documents published between June and November 2006. 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 Distribution Unit <distri@icimod.org>



Kainthola, S. D.; Rana, D. S.; Singh, N.; Naithani, P.; Negi, B. S.
Community Rights and Livelihoods in the Nanda Devi Biosphere Reserve. Talking Points 1/06 34p ISBN-13 978-92-9115-012-0 Price: \$ 10/\$7 \$5

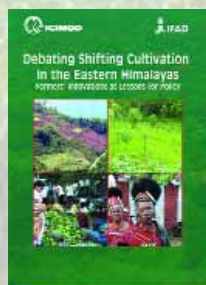
This book revisits the communities surrounding Nanda Devi where the Chipko movement began in the 1970s. Here, where conservation activism laid down its roots, people lost their access rights to traditional commons a decade later in the name of conservation. The book documents in concrete terms the realities and impact of conservation on local people's lives and livelihoods. The picture presented echoes what is happening in many conservation areas around the world: well-meaning conservation measures have failed the very communities that have preserved the landscape through centuries. In Nanda Devi the plight of local communities is gradually being recognised and attempts have been made to redress the balance. Much remains to be done, however, and the book contributes to discussions on the special needs and moral rights of communities in conservation areas. We hope it will help governments and policy-makers realise better the need to integrate communities and local needs into conservation plans.



Xu Jianchu; Eriksson, M.; Ferdinand, J.; Merz, J. (eds)
Managing Flash Floods and Sustainable Development in the Himalayas, Partnership Platforms 3/06 81p ISBN-13 978-92-9115-010-6 Price: \$ 10/\$7 \$5

This publication presents the findings and results of the 'International Workshop on Flash Floods and

Sustainable Development in the Himalayas' organised by ICIMOD, the China Meteorological Administration, and WMO in Lhasa, PRC, in October 2005, with support from the Government of Norway and the USAID Office of US Foreign Disaster Assistance. It presents up-to-date knowledge about flash floods and their management in each of ICIMOD's eight regional member countries, possibilities for forecasting and early warning, and discussions about the importance of community-based disaster reduction management. The book concludes with the 'Lhasa Declaration for Flash Flood Management', which provides important guidance not only for the Himalayan region, but also for the world as a whole. The detailed country reports are provided on a CD-ROM included with the book.



Kerkhoff, E.; Sharma, E. (comp.)
Debating Shifting Cultivation in the Eastern Himalayas: Farmers' Innovations as Lessons for Policy. 82p ISBN-13 978-92-9115-009-0 Price: \$ 15/\$10/\$7.50

Most people see shifting cultivation as outdated and destructive, but farmers in the eastern Himalayas still prefer to farm in this way. This study takes a fresh and unbiased look at the practice to find out why. It shows that indigenous farmers have much to teach the world about the efficient use of their landscape for combined agriculture and forestry. Shifting cultivators conserve more forests on their land than any other farmers – while maintaining crop productivity, avoiding soil degradation, and conserving biodiversity. The findings contain important lessons for policy-makers and others: farmers' innovations can be used to improve shifting cultivation and adapt it to modern needs, rather than trying to replace it with alternatives.

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>

General Publications

- Newsletter No. 50: A Safer and Just Mountain Habitat for All (Summer 2006)
- ICIMOD Calendar 2007
- ICIMOD Year Planner 2007

Leaflets

- Medicinal and Aromatic Plants Programme in Asia
- Capacity Building of Community-Based Organisations in Advocacy in the Himalayas
- Regional Programme on Access and Benefit Sharing from Genetic Resources and Associated Traditional Knowledge in the Eastern Himalayas
- The Shillong Declaration
- The Lhasa Declaration
- Satellite Rainfall Estimates in the Hindu Kush-Himalayan Region

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ICIMOD activities?**

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<http://www.icimod.org/enews/>

- Development of an ASSESSment System to Evaluate the Ecological Status of Rivers in the Hindu Kush-Himalayan Region
- Living with Risk - Sharing Knowledge on Disaster Preparedness in the Himalayan Region
- ICIMOD flyers in Bhutanese, Chinese, Hindi, and Nepali

Other publications by ICIMOD staff

Chettri, N.; Sharma, E. (2006) Assessment of Natural Resources Use Patterns: A Case Study Along a Trekking Corridor of Sikkim Himalaya, India. In *Resources, Energy, and Development*, 3(1): 21-34

Kollmair, M.; Gurung, G. S.; Hurni, K.; Maselli, D. (2005) 'Mountains: Special Places to be Protected? An Analysis of Worldwide Nature Conservation Efforts in Mountains.' In *International Journal of Biodiversity Science and Management*, 1: 181-189

Yan Zhaoli; Wu Ning; Yeshe Dorji; Ru Jia (2006) 'A Review of Rangeland Privatisation and its Implications in the Tibetan Plateau, China.' In *Nomadic Peoples*, 9(1/2): 31-51

New appointments

Sagar Ratna Bajracharya, Satellite Hydrology Officer, WHEM

Mr. Sagar Ratna Bajracharya, a Nepali national, joined ICIMOD as a Satellite Hydrology Officer in the Water, Hazard, and Environmental Management, WHEM Programme in June 2006. He will be working in the project on Application of Satellite Rainfall Estimates (SREs) in the HKH region, focusing on validating SREs provided by the National Oceanic and Atmospheric Administration (NOAA) to improve rainfall forecast products.

Mr Bajracharya has worked in different capacities on several ICIMOD projects, from workshop resource person to field officer in RS/GIS analysis in the Italian

project on Sagarmatha National Park and earthquake damage assessment in Hilkot, Pakistan.

He holds two Master's degrees: in Geo-informatics from the International Institute for Geo-information Science and Earth Observation (ITC), Holland, with specialisation in GIS, and in Geo-science from Tribhuvan University with specialisation in Geomorphology.



Inayatullah Chaudhry, Regional Programme Coordinator-Pakistan

Dr. Inayatullah Chaudhry, a Pakistani national from Faisalabad, will join ICIMOD from December 1, 2006 as Regional Programme Coordinator for Pakistan with the Policy and Partnership Development (PPD) Unit of the Centre. He will be based in Pakistan and will report directly to the Director General.

Dr. Inayatullah has a Ph.D. in Agriculture with specialisation in Entomology/Systems Ecology, and

Statistics and Computer Sciences from Oklahoma State University, USA. He has a broad depth of experience leading and managing complex, multi-location national and international programmes, and setting up new institutions. Prior



to joining ICIMOD, he was with the United Nations Development Programme since 1997, where he was Assistant Resident Representative providing technical guidance and supervision to UNDP-funded community-based projects. He managed UNDP's Sustainable Livelihood Unit in Pakistan from 2001 to 2006. He has also served in various capacities with the U.S.

Department of Agriculture, the Pakistan Agricultural Research Council, the International Centre of Insect Physiology and Ecology based in Nairobi, Kenya, and the Sustainable Development Policy Institute in Islamabad.

Dr. Inayatullah has received many awards throughout his career and has an extensive publications record as a distinguished scientist.

Julie Dekens, Institutional Specialist/Researcher, WHEM



Ms. Julie Dekens is a graduate in Human Geography, University of Geneva, Switzerland. She has a Masters degree in community-based natural resource management from the Natural Resources Institute, University of Manitoba, Canada. Her research documented

and analysed the capacity of a village in the Darjeeling district to adapt its livelihoods to multiple stresses over

a 50-year period. Julie has an interest in community resilience-building for change.

After completion of her Masters, Ms. Dekens worked as a consultant and as an intern for Inter-cooperation, the Swiss Foundation for Cooperation and Development in Bern on community adaptation to climate change. Since July 2006, She has been part of the WHEM Programme of ICIMOD as an institutional specialist. She is documenting local knowledge on disaster preparedness in Bangladesh, India, Nepal, and Pakistan.

Shikui Dong, Visiting Scientist, NRM



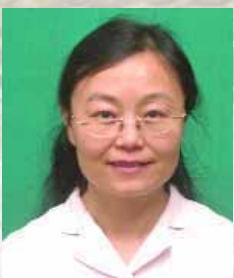
Dr. Shikui Dong is an associate professor in the Environmental School of Beijing Normal University. He received his B.Sc., M.Sc., and Ph.D. in Grassland Science at Gansu Agricultural University in 1995, 1998, and 2001, respectively, and has worked as a post-

doctoral researcher in Beijing Normal University from 2001 to 2003. Dr. Dong has coordinated research projects focusing on grassland management in the alpine regions of the Qinghai-Tibetan Plateau of China and has published more than 60 scientific papers on

alpine rangeland resource management. He is also a reviewer for the *International Journal of Livestock Science* and a member of the editorial board of the *African Journal of Agricultural Research*.

Currently, Dr. Shikui Dong is working at ICIMOD as a visiting scientist for the project on 'Sustainable Rangeland Resources and Ecosystem Management in Nepal' which is funded by the Asian Scholarship Foundation (ASF). Through this project, he will search for effective managerial measures at regional, community, and household levels to resolve issues in sustainable rangeland resource and ecosystem management in Nepal.

Fang Jin, EcoHealth Specialist, WHEM



Dr. Fang Jing, a Chinese national, joined ICIMOD as EcoHealth Specialist in the WHEM Programme from 16 August 2006. Dr. Fang Jing has a Ph.D. in Development Studies in Public Health from the Institute of Development Studies (IDS), Sussex

University, UK, and has a Masters degree in Medical Sciences from Harbin Medical University, China.

Dr. Fang has extensive field and international experience in gender and public health in Southwest

China and Southeast Asia. She brings a rich and valuable knowledge and experience in medical and related social sciences, particularly in gender and health areas.

Among her many positions and responsibilities, Dr. Fang Jing is a member of the Gender and Health Equity Network (GHEN), a cross-continental group consisting of researchers, government officials, and practitioners in India, UK, US, China, Sweden, Mozambique, and WHO. She will be coordinating the IDRC/ICIMOD EcoHealth Project that deals with ecosystems and human health issues related to land-use transition.

Elizabeth Fox, Programme Assistant, Information Services, Mountain Forum Secretariat

Ms. Elizabeth Fox recently joined the Mountain Forum Secretariat (MFS) as the Programme Assistant, for Information Services. She completed her B.A. in Human Environmental Sciences from the University of Alabama (USA) and has a Masters degree in Political Science from the University of Rome, 'La Sapienza', Italy.

A communications advocate specialising in rural conservation of biocultural diversity and mountain protection issues, Ms. Fox, just before joining the MFS, was working for the Cinque Terre National Park and Marine Protected Area, a UNESCO World Heritage

site in Liguria, Italy. She was concerned with international affairs and cooperation, as well as with communication, translation, and editing of Park materials. Ms. Fox prepared the media plan for the Mountain Connectivity Conservation Management international workshop held in Ecuador in November 2006 by WCPA/IUCN Mountains Biome Theme.

An American citizen from rural Alabama, she has permanent residence in Monterosso al Mare, Italy.



Ramonette Jean Marie Pacia, Training Officer, PPD

Ms. Monette Pacia, a national of the Philippines, joined ICIMOD as a Training Officer in the Policy and Partnership Development Pro-gramme in June 2006.

Ms. Pacia brings with her eight years of development experience in capacity building, research, project management, and resource generation in the fields of rural development, women and children's welfare, and participatory approaches. She has worked for the International Institute of Rural Reconstruction (IIRR) based in the Philippines where she was involved in managing, designing, and facilitating training programmes for development practitioners from

international NGOs, government, academe, and multi-lateral and bilateral organisations, especially from Asia and Africa. Training programme ranged from participatory action research for CBNRM to gender mainstreaming. Ms. Pacia also has rich social welfare and research experience. She has post-graduate credits in Social Psychology and a Bachelor's degree in Social Work from the University of the Philippines.



Arun Bhakta Shrestha, Climate Change Specialist, WHEM

Dr. Arun B. Shrestha, a Nepali national, joined the Water, Hazards, and Environmental Management (WHEM) Programme in July 2006 as a Climate Change Specialist. He has a Ph.D. in Earth Sciences from the University of New Hampshire, USA, and a Master's degree in Hydraulic Engineering from Minsk, the former USSR.

Before joining ICIMOD, Dr. Shrestha worked for the Department of Hydrology (DHM) and Meteorology, Government of Nepal, for 16 years. His main areas of expertise include climate change, glaciers and glacial hazards, glacial lake outburst mitigation, atmospheric environment, remote sensing, and hydrological

modelling. Dr. Shrestha has had several publications in peer reviewed international journals as well as in national journals and magazines. He was actively involved in the Tsho Rolpa GLOF Risk Reduction Project and was in the scientific team for the preparation of the First National Communication of Nepal to the United Nations Framework Convention on Climate Change (UNFCCC).



Attention readers!

The final findings of the **ICIMOD Readership Survey 2006** will be posted on our website www.icimod.org. Do look out for it. We thank you for your most valuable comments and contributions.

New associates, consultants, and interns

(as of November 2006)

Consultants

Nirmal K. Bhattarai, Consultant, ARID
Pradeep Man Dangol, MENRIS-IKM
Deoraj Gurung, MENRIS-IKM
Li Qiao Hong, WHEM
Udayan Mishra, APMN-IKM
Tian Yu Qiang, Assistant Coordinator for Mobile Workshops (WHEM)
Prajna Regmi, MENRIS-IKM
Ram Prasad Sah, Policy Consultant, PPD
Karma Toeb, MENRIS-IKM
Kabir Uddin, MENRIS-IKM
Li Zhuoqing, Consultant, WHEM

Interns

Liang Chungfang, MENRIS
Tara Dhakal, CEGG
Susmita Dhakal, Kyoto-ARID
Nagma Hamal, MAPPA-ARID
Shirish Gautam, ARID
Shobhana Ghimire, PPD
Tashi Gyalmo, MENRIS-IKM
Sapana Maharjan, ARID
Robet Maharjan, Directorate
Paribesh Pradhan, Mountain Forum Secretariat
Gyan Kumar Chhippi Shrestha, WHEM

Staff separation

Madhav P. Dhakal, Research Associate-PARDYP (1 May 1997 - 30 June 2006)
Bhawani Shanker Dongol, Research Associate-PARDYP (1 Jan. 2000 - 30 June 2006)
Pradeep M. Dongol, Research Associate-PARDYP (1 May 1997 - 30 June 2006)
Shirish Gautam, Intern-ARID (July 3, 2006 to Sept. 2, 2006)
Pema Gyamtsho, Agriculture Resources Policy Specialist. (1 Nov. 2002 - 31 Aug. 2006)
Tashi Gyalmo, Intern - MENRIS-IKM (July 1, 2006 to Sept. 30, 2006)
Abdul Qadeer Jawad, Intern-ADMIN (July 1, 2006 to Aug. 31, 2006)
Surendra Rai Joshi, Action Research Officer-Beekeeping (23 Nov. 1999 - 30 Sept. 2006)
Niraj Kakati, Intern-NRM (Sept. 28, 2005 to Oct. 15, 2006)
Robet Maharjan, Intern-Directorate (July 25, 2006 to Sept. 25, 2006)
Sapana Maharjan, Intern-ARID (July 3, 2006 to September 2, 2006)
Tek Jung Mahat, Intern - MFS (Sept. 16, 2005 to Sept. 25, 2006)
Udayan Mishra, Intern - APMN-IKM (May 1, 2006 to 31 July 2006)
Zbigniew Mikolajuk, Programme Manager, Information Knowledge Management (1 Nov.2003 - 31 Oct. 2006)
Sugam Nepal, MF-APMN Node Manager (1 Aug. 2005 - 31 July 2006)
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Roger John White, Regional Project Coordinator-PARDYP (26 Nov. 2000- 31 Aug. 2006)
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37th ICIMOD Board of Governors Meeting

November 2006



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