

SUSTAINABLE DEVELOPMENT OF MOUNTAIN COMMONS

This programme focuses on the sustainable management of more than 60% of the HKH which consists of rangelands and forests, of the water resources that are so essential for maintaining and/or improving farming systems, livelihoods as a whole, and of the biodiversity of this unique ecosystem.

Participatory action research programme on equity and poverty in the management of common property resources

In view of the absence of an organised body of knowledge on equity and poverty in the management of mountain commons ICIMOD launched a two-year programme entitled 'Participatory Action Research Programme in Equity and Poverty in the Management of Common Property Resources in the HKH'. The programme was launched in mid-2001 and is yet another milestone in ICIMOD's history of taking up challenging issues that affect the lives of mountain people.



Yunnan women resting after a hard day's work, P R China

The need to address issues related to equity and poverty has emerged out of ICIMOD's past work on common property resources. These include the ongoing programme on Participatory Natural Resources Management, addressing issues of forest resources and governance; Analysis and Promotion of Sustainable Water Harvesting Technologies and Management Systems in the HKH; and the Regional Rangeland Programme for the HKH. The sustained work carried out under ICIMOD



Sacred Forest, Yunnan, P.R. China



Forest User Group, Joint Forest Management, Tripura, India

programmes to address the three major commons of forest, water and rangeland resources highlights the urgency for undertaking sustained and organised work to gain a better understanding of equity and poverty. At present there is no known cross-country empirical effort to research, analyse and monitor the impact of these development outcomes in the HKH from an equity perspective. This is especially important as poorer marginalised sub groups among resource appropriators depend disproportionately on the resources for their livelihoods.

The overall goal of the programme is to gain a better understanding of equity and poverty linkages and to advocate and mainstream appropriate strategies in policy and practice that ensure equitable access and distribution of benefits from common property resources of the HKH. The programme aims to evolve a conceptual framework of interlinkages of equity and poverty with common property resource management, undertake analysis of policies that aim to address equity-related issues in the forestry, local water use and rangeland sectors and identify policy and practice-level interventions that aim to mainstream equity and poverty concerns.

The programme is being implemented in six HKH countries of Bangladesh, Bhutan, China, India, Nepal and Pakistan. In these countries, management regimes for common property resources differ in policy and practice. Some examples include customary collective management of resources in the state of Meghalaya in India, private tenure of grasslands in China and institutional innovations like community forestry and joint forest management in Nepal and India respectively.

The expected outcomes of the programme are as follow

- Contribute to gaining a better understanding of equity and poverty linkages in relation to common property resources in the HKH
- Generate empirical case studies on development initiatives in the HKH that have attempted to mainstream equity in different common property resources
- Identify best practices and findings that can be used to influence policies and practices in the sustainable management of common property resources
- Highlight the urgency and need to address equity issues in the HKH as a precursor to sustainable management of resources
- Document and disseminate specific examples of successful advocacy in favour of marginalised communities in the Hindu Kush-Himalayas
- Publish and disseminate case studies, manuals, policy briefs on equity issues to overcome major lacunae in literature and practice
- Establish a network of committed individuals and professionals and explore possibilities of continuing linkages

Regional rangeland programme

The Regional Rangeland Programme (RRP), funded by the Federal Government of Austria, began in 1999 and will run through June 2002. It aims to reduce poverty among rangeland dependent mountain people and to improve the productivity of the rangeland ecosystems of the HKH-Tibetan Plateau region. RRP's guiding principals are to diversify and improve pastoral livelihoods; to maintain or improve rangeland quality; to improve participation, principally at the local level; and to promote social and gender equity.

Conceptual framework and strategy

The RRP takes an interdisciplinary approach, focusing on the linkages between pastoralists, the environment, the market, and government policies and development plans. Participatory action research is used to assess, plan, and implement strategies among actors in the process of development, in an environment in which issues are complex and opinions are diverse about how best to proceed. This approach has encouraged participants to reflect on their assumptions and outcomes to identify possible best practices to implement at the local level.

ICIMOD has formed partnerships with institutions concerned with rangeland conservation and development in Pakistan, India, China, Nepal and Bhutan. Interdisciplinary diagnostic case studies to identify the socioeconomic and environmental conditions that affect pastoral communities are being carried out. Subsequent phases of the programme involve innovation testing and policy analysis. The case studies are complemented by remote sensing analysis to correlate trends in climate, vegetation and livestock populations in the HKH region.

Since its inception, the project has moved from focusing on technology transfer towards a commitment to a process of continuous learning and collaborative decision-making among all stakeholders, from local herders to policy-makers.

This approach requires local commitment to change, but the capacity of local people to participate in a process of change needs to be developed over time. The needs of the local



Mongol camp, Qinghai, P R China



Rangeland



Nomad camp, Sichuan, China

people must be identified and their access secured to resources and information. Herders are likely to reject innovations that put their livelihoods at risk due to their uncertain socioeconomic and climatic environments. Acceptable innovations will need to be introduced in ways that empower stakeholders and encourage collaborative decision-making.

Impacts of the programme

The programme has had wide-ranging impacts. Partner institutions have an increased awareness of the need for an inter-disciplinary and participatory approach to addressing rangeland issues. Action plans to incorporate participatory approaches in their own projects, as well as ICIMOD sponsored ones, have been prepared by partner institutions. Many collaborating institutions have shared the costs of research and training events, and have organised many of these activities.

Forums have been organised to provide feedback to decision-makers about the outcomes of training events and diagnostic studies. For example, the Sichuan Provincial Animal Husbandry Bureau, China, has shown strong interest in supporting the action plan prepared by ICIMOD's Sichuan partner group. The Balochistan government (West Pakistan) has pledged to increase focus on livestock and rangeland issues and to help support participatory research with local nomadic communities. The Ladakh (North India) coordinating partner has used the participatory tools it learned to conduct planning meetings in the nomadic areas of the Ladakh Changtang. These plans were received favourably by the Ladakh Hill Council.

The seed has been planted for further organisational change to facilitate participatory rangeland management in institutions such as the Sichuan Grassland Institute. This should lead to improved performance, more networking, and ultimately policy change in Sichuan.

Local initiatives have included one in northwest Yunnan, China, to test and develop native forage species (Spring 2001). The State Key Laboratory of Arid Agro-ecology, China, has used the new approaches to improve implementation of its development project in Maqu County, Gansu, by basing rangeland management plans on the indigenous knowledge of the herding community. They are also using indigenous indicators to challenge the scientific assumptions for determining the carrying capacity of pastures.

People and resource dynamics project

The Middle Mountains of the HKH region are the most populated mountain area in the world and the population is still growing rapidly. Increasing population demands mean increasing amounts of natural resources for production of adequate food and water supplies. This in an area where water and land resources are already limited and pressure has led to widespread degradation.

PARDYP Findings

Research work in the Jhikhra Khola watershed, 45 km east of Kathmandu, has been carried out by PARDYP and its predecessor projects since 1989. In this watershed, water is the main concern, not only for scientists, but also for local residents. Inadequate water supplies for irrigation and for domestic purposes top the list of concerns. These shortages are mainly during the dry months of the year from October to May, and this affects staple crops, such as wheat and potato, and increasingly a range of cash crops.

The People and Resource Dynamics of Mountain Watersheds in the HKH Project (PARDYP) is investigating these issues and factors leading to resource degradation on a watershed scale in five watersheds across the region (one in China, one in India, one in Pakistan and two in Nepal).

Local residents are concerned about the quality of their drinking water sources. This was the finding of a watershed-wide survey of public water sources, which revealed heavy microbiological contamination. Chemical pollution is limited but elevated nitrate levels and often high phosphate levels in wells and springs close to the intensively used valley bottom are likely to get worse. The effect of the pollution is evident from a survey by a health organisation of the watershed. About 25% of the patients visiting a health post are suffering from water-related diseases.



Rain water harvesting

Trials to increase water availability through roof water harvesting and surface runoff water harvesting show promise. Demonstrations of alternative methods of irrigation, such as drip irrigation, can reduce the water requirements for a bitter melon crop by half compared to bucket irrigation. Increased efforts to protect springs and catchments will hopefully lead to improvements in water quality in the long term. In the short term inexpensive treatment methods such as the use of locally fabricated water filters set in plastic buckets can significantly reduce coliform levels.



Low cost drip irrigation trial for cash crop production



Cauliflower production during the dry period in a dryland area



Water quality awareness training to local science teachers and women health volunteers

Degradation of land resources and lowered soil fertility are widespread in the watershed. Five point five per cent of the watershed is considered to be heavily degraded with little or no vegetation cover. These areas produce large amounts of sediment as the erosion plot experiments have shown. Degraded areas produced on average 21 t/ha per year over a three-year period between 1998 to 2000. Grassland produced only a negligible amount of sediment, less than 1 t/ha per year over the same period. High rates of soil erosion are observed at the start of the monsoon but, as crop cover is established, erosion decreases, however, on degraded lands with very poor ground cover, erosion rates are constant throughout the monsoon season.

Soil fertility is declining on the intensively cultivated irrigated terraces. In the early 1990s phosphorous deficiencies were common, and this has been corrected by large doses of phosphate fertiliser. Potassium levels have now fallen. No doubt farmers will overcome this new nutrient deficiency but micro-nutrients are likely to be in deficit soon. Farmers used to apply only urea (nitrogen based fertiliser) up to the mid 1990s. Since about 1995, heavy doses of DAP (phosphorous and nitrogen based fertiliser) were applied leading to water quality concerns and eutrophication. The use of potash (potassium based fertiliser) is limited in the area. The importance of organic matter management is increasingly recognised by farmers in the area to the extent that they now buy farmyard manure from as far away as Kathmandu and are also bringing straw from outside the watershed to increase soil organic matter levels.

While these results are from just one watershed, very similar patterns and issues are emerging from PARDYP work in China, India, and Pakistan.

Regional cooperation in flood forecasting and information exchange

Countries in the HKH face flood disasters regularly. In particular, the Ganges, Brahma-putra, Meghna, and Indus flood plains are affected by floods every year. This region contains one of the greatest concentrations of people in the world, with a high rate of poverty; and population growth has increased the vulnerability to flood disasters. Flooding is a part of the growing spiral of poverty. Economically disadvantaged people move to the flood-prone lowlands as they lack other options; at the same time they lack the resources to respond to and recover from floods. Flooding poses severe constraints on socioeconomic development and investment in agriculture, infrastructure and industrial production; thus management of floods is vital. The impact of floods must be lessened both to reduce poverty and to save lives.

Building dams and other river control measures plays a role in flood mitigation, but one of the most cost-effective means of reducing the impact of floods is the non-structural approach of providing

Flood Forecasting: Headline News

Press Report The Kathmandu Post (May 16, 2001)

With a vision that timely forecasting of floods can save lives and property, experts from the Hindu-Kush Himalayan region and various international organisations have converged here for a consultative meeting on developing a framework for flood forecasting in the region.

Minister for Science and Technology Surendra Prasad Chaudhary on Wednesday opened the four-day meeting attended by experts from Bangladesh, Bhutan, China, India, Nepal and Pakistan. The meeting is jointly organised by the International Centre for Integrated Mountain Development (ICIMOD), and the World Meteorological Organisation (WMO), and supported by HMG's Department of Hydrology and Meteorology (DHM).

"The 1993 flood disaster in Nepal claimed more than 1,300 lives and caused enormous damage to property and infrastructure," Chaudhary said. "It has taught us a painful lesson on why timely flood warning systems should also be in place on some of the major rivers in order to save lives and property and avoid disasters." Dr Adarsha Pokharel, Director General of the DHM, spoke of the urgent need to carry out extensive research for enhanced data acquisition and management, analysis, and plausible interpretations of hydro-meteorological data on the basis of which flood forecasting is done. ICIMOD Director General, Dr J Gabriel Campbell, New Delhi-based UNESCO Director, MS Alam, and other experts also emphasised the need for an effective flood forecasting mechanism in the region.

Flash floods and landslides routinely leave trails of destruction in the region every year. In Nepal, floods and landslides are considered as the second biggest killer after epidemics, with the average annual toll standing at 350. Between 1983 and 2000, at least 2,300 livestock and more than 6,700 houses and 4,760 hectares of arable land have been damaged by landslides and avalanches, according to data made available by the Home Ministry.



Flood 2000, Bangladesh, Source: Sustainable Development Networking Project (SDNP), E-17 Agargaon, Sher-e-Bangla Nagar, Dhaka-1207, Bangladesh, <http://www.sdndb.org>

people with sufficient advance warning. To forecast floods with any degree of accuracy, timely and reliable hydrometeorological information is needed from the whole of the river basin. Since many of the rivers in the HKH region flow through more than one country, information must be exchanged across national borders. As yet, however, there is no regional framework for multilateral exchange, although there are successful examples of agreements for bilateral exchange of data.

Particular concern about this was voiced during the 2nd Steering Committee Meeting of the hydrological research network HKH-(FRIEND) Flow Regimes from International Experimental Network Data, part of UNESCO's International Hydrological Programme held in April 2000 in Kathmandu. In response, ICIMOD has now started on a long-term project with the final aim of establishing an operational flood information system for the HKH region. As a first step, ICIMOD and the World Meteorological Organization (WMO), supported by the US Department of State Regional Environment Office for South Asia (REO South Asia), US Office for Foreign Disaster Assistance, and DANIDA, organised a high-level consultative meeting on 'Developing a Framework for Flood Forecasting and Information Exchange in the HKH' in Kathmandu in May 2001. Participants from Bangladesh, Bhutan, China, India, Nepal and Pakistan, agreed on an initial action plan for regional co-operation for flood information exchange.

The second phase to be implemented in 2002 will continue the dialogue on regional cooperation and develop a project document for the operationalisation of a flood information system based on WMO's World Hydrological Cycle Observing System (WHYCOS) system, the HKH - Hydrological Cycle Observing Systems (HKH-HYCOS). Several activities are planned amongst which formation of a Consultative Panel with representation from each of the participating countries is one of them. The panel will meet in Kathmandu in May 2002 to finalise the concept. ICIMOD, in collaboration with the WMO, and with input from the member countries is developing a website that will function as the means of sharing and disseminating flood information. The website, registered as www.southasianfloods.org, is intended as a regional communication platform for the exchange of data and information. It will be launched for testing in 2002.

Sustainable water harvesting technologies and management systems

With support from the Ford Foundation, ICIMOD has been supporting research and training on water harvesting in the HKH region since 1997, first under the regional project 'Analysis and Promotion of Sustainable Water Harvesting Technologies and Management Systems' (to March 1999), and then under the integrated project on 'Policies, Governments, Participation and Practices for the Sustainable Management of the Mountain Commons of the HKH' (May 1999 to April 2002).

The main objectives of the project are to:

- create greater awareness of the technical, organisational and managerial aspects of local water harvesting systems (LWHS) in micro-watersheds of selected mountain areas. This includes publishing information on local participatory water harvesting;
- increase national support and awareness for local participatory water harvesting programmes. This includes influencing policy-makers to promote water harvesting and sustainable water management;
- encourage the installation of LWHSs by raising awareness of the benefits amongst potential users. The project aims to establish demonstration sites amongst local user groups that can be used in training activities.



Water Harvesting

- establish, promote and strengthen the capacities of water users' associations to enable local communities to harvest water; and
- increase the number of people trained in LWHS by establishing research, demonstration and training centres. The project intends to produce training manuals.



Landslides that killed 16 people and damaged 19 houses in Bahakot VDC of Syangja District



Bridge damaged by the Pampa Khola in Aug 2001 in Kathar VDC of Chitwan District

Debris flow deposited in Syangja District

Risk, vulnerability assessment and hazard mapping for community disaster management

Nepal is a country highly prone to water induced disasters, such as floods, landslides, debris flows and soil erosion, that cause considerable loss of lives and property every year, impacting 70% of Nepal's 75 districts. During the period from 1983 to 2000, about 20,000 people were killed and loss of property was reported to the tune of 13,500 million rupees. Nearly 29% of annual deaths and 43% of the economic loss are caused by floods and landslides, with a great impact on sustainable development.



Distribution of Landslides in Bahakot VDC of Syangja District, field survey, 2001



Flood levels in different years, in Gulariya Municipality of Bardia District, field survey, 2001



VDC-level group discussion in Rait VDC of Tanahu district

Risk assessment and hazard Mapping

Risk assessment and hazard mapping are the basis of effective disaster mitigation and preparedness planning of the communities in disaster prone areas. Hazard mapping activities were carried out in the 8 pilot Village district communities (VDCs) of the above four districts. Remote Sensing and GIS technologies were used for risk assessment and mapping activities to help to identify gaps in the district and community capabilities and the what where how and when of the external assistance required. Local farmers and the district staff of PDMP and VDC members assist our technical team in carrying out field data collection and map verification.