Sustainable Management of Mountain Commons

The People and Resource Dynamics Project (PARDYP)

This vibrant regional research network, funded by SDC and IDRC, looks for solutions to natural resource management problems with farmers. The five study areas are watersheds of between 30 and 110 sq. km in China, India, Pakistan, and Nepal (2 watersheds). The clients of the research are the watersheds' inhabitants. PARDYP draws on experiences of its many partner institutions and from other national research institutes to share the results of various research and technology testing activities to find out which innovations work, which do not, and why.

The first full year of PARDYP phase 2 was in 2000. The proceedings of the phase1, 1996-99, final workshop, held in Baoshan in 1999, were finalised and printed. The record of achievements to date provide time for reflection and refocusing to ensure that the activities for 2000 to 2002 could be planned in an integrated manner. Although a new regional coordinator, based at ICIMOD, was appointed in November 2000, overall the continuity of teams and partners was maintained reflecting the importance attached to this project by participating institutions.

Teams continue long-term, detailed monitoring of erosion plots and hydro-meteorological data. Several themes have emerged independently from the collaborating institutions. There is an increasing awareness of the importance of Non Timber Forest Products as sources of income for mountain inhabitants. There is also great interest in cultivating medicinal plants, and being able to source these as coming from organic and sustainable sources. Many commercial organisations are seeing the opportunity to develop a wide range of products from 'natural' sources. These cover from soft drink ingredients to shampoos. There are opportunities for farmers living in different agro-ecological zones. In future, further intensification of agricultural production in areas with potential through improved crop varieties, bio-fertilisers, and polythene film technology are likely. In the longer term it is likely that certification of organic products, from sustainable sources and /or equitably produced, will become important in terms of value addition.

The wide range of expertise available through PARDYP and the flexibility offered by PARDYP's donors have facilitated a broad range of activities from beekeeping to rural energy needs in Pakistan, structure and functioning of community institutions and livelihood potentials in India, watershed governance in China, and common property resource rehabilitation to soil conservation in Nepal. PARDYP's strength is that it is able to call upon local expertise in a whole range of fields.

The benefits of this network can be put to the best use by sharing results and experiences across the network and with collaborating institutions and their partners in all the countries. The comparative advantages of mountain environments and their unique agro-ecology have to be taken into account and solutions have to be tailored to match the inherently complex natural resource management problems.

Sustainable Water Harvesting

There has been substantial progress in achieving the objectives of the Sustainable Local Water Harvesting Project during the year 2000.

Twelve rooftop water-harvesting systems were built with the participation of nine households, including two temples and a school, in Kabhre Palanchowk district of Nepal during the hands-on training of technicians from Nepal and Bhutan. They resulted in saving a day's labour at one person per day per household during the monsoon period. As a consequence, women got more leisure time and contributed to transplanting of rice nurseries and were averted from the risks in fetching water from far away water springs during the rainy season.

The National Task Force on Water Harvesting, constituted in June 2000 by the Water and Energy Commission Secretariat, Ministry of Water Resources, HMG/Nepal, is giving final touches to the policy draft which will be widely circulated for discussion before finalisation.

Partnerships with other organisations in Pakistan and India were strengthened through mutual visits. The Environment Rehabilitation Project in NWFP and the Punjab, Pakistan; and the Watershed Management Project in the lesser Garhwal Himalayas of Danda, Chandrabadni and Garhkot, Uttaranchal, India, have shown keen interest in promoting local water management practices with technical assistance from ICIMOD in training, research, and demonstration.

Flow Regimes and Network Data

The Hindu Kush-Himalayan Flow Regimes from International Experimental and Network Data (HKH-FRIEND) Project is one of the eight groups of UNESCO's International FRIEND Project. It is a regional network for hydrological research which has official and unofficial members from eight countries - Afghanistan, Bangladesh, Bhutan, China,

ACTIVITIES CARRIED OUT BY PARDYP IN FIVE WATERSHEDS

Nepal: Access to water of adequate quality and quantity is the primary concern of farmers living in the two PARDYP watersheds in Nepal, the Jhikhu Khola and the Yarsha Khola. Most farmers cite shortage of irrigation water in the dry season, the long walking distances to collect domestic water, and deteriorating quality of water for both household use and for irrigation. In 2000 PARDYP supported the construction of 8 ferro-cement water jars in Yarsha Khola and 13 in Jhikhu Khola. The jars, each of 2,000l capacity, are filled by collecting rainfall from a house roof. The jars are robust, durable, and can be made by local masons using materials readily available in the village. Where jars are installed, the households can use water for domestic needs harvested from their house roofs for the duration of the monsoon with a carry over of approximately 2 months use. Other trials are underway to construct underground cisterns to collect runoff to be used for irrigation in the dry season. When linked to locally manufactured drip irrigation systems, water use efficiency can be significantly improved.

India: In the Garur Ganga watershed of Uttaranchal State, the PARDYP team of scientists from the **GB Pant Institute of Himalayan Environments** used bio-fertilisers in on-farm trials with 17 farmers; this covered a range of vegetable and grain crops. A number of *Rhizobium* and VAM (vesicular arbuscular mycorrhiza) strains were used. Early indications are that farmers can expect their yields to increase by 10 - 20 % when using good strains of *Rhizobium* and VAM. The bacteria are improved strains that occur naturally and therefore are non-damaging and non-toxic to the soil and to the plant. It is thought that crop yields can be increased by coupling these soil supplements with polythene tunnels and polythene pits. Further farm trials will be carried out in 2001.

China: The PARDYP team has been consolidating its innovative work on Participatory Technology Development. The team from the **Kunming Institute of Botany** has supported a number of farmer-led initiatives that should help village-level development activities flourish and provide extra income. These include walnut grafting, farmer-run, vegetatively propagated tea nurseries (one has 40,000 plants this year), improved livestock housing, and the introduction of improved livestock breeds. Part of the programme includes participatory monitoring and evaluation that should lead to further improvements in the process. A manual is being produced so that the techniques and methods developed so far can be shared by other teams within the PARDYP research network.

Pakistan: A team from the **Pakistan Forestry Institute** has carried out an ethnobotanical study in the Hilkot-Sharkul watershed. This study has identified plants that have an economic value that can be collected from the wild and medicinal plants that can be grown commercially on common or agricultural land. Several species are no longer found in the watershed, including *Taxus baccata*, the source of the anti-cancer agent Taxol. There is potential for cultivating medicinal plants as an income-generating activity. Further work will be carried out on the floristic composition of the watershed and the present status of medicinal cum economic plants, including their market potential outside the watershed. The study will also look at the prospects for conserving endemic medicinal and economic species for sustainable use through community participation.

India, Myanmar, Nepal, and Pakistan. The project includes the Regional Hydrological Data Centre (RHDC) and six research groups, viz., Database, Flood, Low-Flow, Rainfall-Runoff, River Water Quality, and Snow & Glacier Groups. The Secretariat of HKH-FRIEND is at ICIMOD.

During 2000 the Secretariat was engaged in preparation and organisation of the Second Steering Meeting of HKH-FRIEND. The Meeting was held at ICIMOD from April 11 - 13, 2000. It was attended by 36 participants including official nominees and observers from the countries of the HKH region as well as representatives from UNESCO's International Hydrological Programme (UNESCO/IHP), the World Meteorological Organisation (WMO), the German IHP/OHP (International Hydrological Programme/Operational Hydrological Programme) National Committee, Federal Institute of Hydrology, Koblenz, the Centre for Ecology and Hydrology - Wallingford (CEH-W), UK, and ICIMOD.

The major decisions taken during the Meeting are as follow.

- The Chairperson of PCRWR was elected as the Chairperson of HKH-FRIEND for two years, effective May 11, 2000.
- The term of office of the present Executive Secretary was extended for two years, till the next Steering Committee Meeting (March 2002)
- The project document of HKH-FRIEND was finalised.
- The Data Protocol of RHDC Guidelines for Acquisition and Dissemination of Data for HKH-region was approved by the member countries.
- The organisation of the following meetings/training was discussed/planned
  - HKH-FRIEND/ICSI Workshop on Snow and Glacier Mass Balance Manual Development to be held from 20-24 March, 2001 at ICIMOD
- HKH-FRIEND Surface/River Water Quality Training Workshop to be held from 21-26 May, 2001 in Islamabad, Pakistan
- Consultative Meeting on Developing a Framework for Flood Forecasting in the Hindu Kush-Himalayan Region (using WMO's WHYCOS in HKH region) to be held from 15-18 May, 2001, Kathmandu

As per the Resource Mobilisation Strategy discussed during the meeting, financial support for the following activities was solicited.

- From UNESCO, New Delhi, and German IHP/OHP National Committee, Federal Institute of Hydrology, Koblenz, Germany for

the HKH-FRIEND Surface/River Water Quality Training Workshop
- From UNESCO, New Delhi, and UNESCO, Paris, and ICIMOD for HKH-FRIEND/ICSI Workshop on Snow and Glacier Mass Balance Manual Development
- From DFID through CEH-W, UK, for HKH-FRIEND activities for the period from 2001-2002

An Inception Workshop of the Rainfall-Runoff Group was held on April 10, 2000, at ICIMOD. It was attended by 5 participants from China, Nepal, and ICIMOD. The Workshop basically discussed the organisation of Regional Workshop/Training on Rainfall-Runoff Modelling in the HKH Region.

Exploring Strategies for Participatory Forest Management in the Mountain Areas of Myanmar

Myanmar's mountain areas contribute significantly to the country's national development. Home to important watersheds, the mountains influence many sectors downstream, including agricultural productivity, hydropower generation, and tourism, among others. Locally, mountain areas and their natural resources are an important source of livelihood, cultural and ethnic diversity, and rich biodiversity. Certain mountain areas of Myanmar currently suffer from unsustainable natural resource management practices, shifting cultivation and subsistence agriculture, degradation, population pressure, and limited education and health facilities. As in other mountain areas throughout the HKH, community forestry (CF) has emerged as a promising strategy for sustainable development.

Traditional dancer of Myanmar

Myanmar's revised Forest Law 1992, and its Community Forestry Instructions (CFI) 1995, have the objectives of attaining environmental stability and meeting the basic needs of rural communities. Approximately 15,000 ha of community-owned forest plantations have been established since 1995 and the Ministry and Department of Forests remain committed to strengthening the implementation of CF throughout the country. Recognising the efforts being made, as well as the need to adopt new strategies to increase awareness among all stakeholders, the Department of Forests, Yangon; the Institute of Forestry, Yezin; and ICIMOD organised the 'First National Workshop on Participatory Forest Management: Implications

POLICY ISSUES ACTION POINTS (FOR PARTICIPATORY FORESTRY IN MYANMAR)

1. Prioritise basic needs of mountain communities.
2. Prepare community forestry projects targeting mountain areas.
3. Seek assistance and mobilise financial & other support from government organisations, non-government organisations, and international organisations for developing multi-sectoral approaches - including livelihood development to promote community forestry in the mountain areas.
4. Increase awareness, through information, education, and communication, of all forestry staff and communities about the environmental consequences of unsustainable forest uses
5. Promote the concept of Trust and Confidence within both forest department and communities.
6. Decentralise decision-making as per the recommendations of the Community Forestry Instructions 1995.
7. Mitigate and/or remove barriers and constraints that hinder implementation of community forestry in mountain areas.
8. Create a Community Forestry Unit within the Ministry of Forests to provide impetus to different aspects of community forestry in the mountain areas.
9. Seek support of other government agencies to implement community forestry where the Forest Department cannot undertake it on its own.
10. Recognise the crucial role of cooperation, coordination, and cross-sectoral linkages.
11. Recognise the urgent need for a comprehensive national land-use policy to resolve land-use conflicts, e.g., forestry, agriculture, and so on.
12. Review, clarify and modify forest law and rules to improve the Community Forest Instructions 1995.
13. Rationalise workloads at field level to facilitate introduction of community forestry.
14. Initiate discussion about evolving a Human Resource Development policy especially for community forestry in the mountain areas of Myanmar.
15. Explore the possibility of a diversified, eco-region specific community forestry in Myanmar.

In addition, the external resource persons recommended and prioritised the following action points.

- Create a Community Forestry unit within the ministry.
- Mitigate and/or remove barriers and constraints that hinder implementation of community forestry.
- Decentralise as per the recommendations of the Community Forestry Instructions 1995.

for Policy and Human Resource Development in the Mountain Areas of Myanmar'.

Held on the campus of the Institute of Forestry from 1 to 4 December 2000, the Workshop's 57 participants included the Deputy Director General, Advisors and Directors of the Forest Department; field staff from many divisions, such as Mandalay, Magway, Sagaing, and Ayarwady; and mountain states, including Rakhine, Shan, Chin, Kachin, and Kayah. Also attending were the rectors of the Institute of Forestry and the Forest Research Institute, representatives of UNDP, Care/Myanmar, the NGOs FREDA and MIRDA, and representatives of community forestry user groups. In addition there were resource persons from China, India, Nepal, and ICIMOD.

During the Workshop a variety of case studies and presentations rounded out participants' understanding of the situation of community forestry establishment and management in Myanmar. In addition, broad-based and focused group discussions were a major aspect of the Workshop activities. Participants worked in mixed groups to consider various factors in Myanmar's implementation of participatory forest management, including key elements of policy to be addressed, the current attitude of Forest Department staff, capacity and training issues, and the working environment in general. Concerns raised during the deliberations were then synthesised and clustered into sets of issues for focus group deliberations.

The workshop endorsed its findings (box text) on various aspects of Community Forestry for Myanmar, bringing the workshop to a conclusion.

HEDGEROW TECHNOLOGY GAINS GROUNDS IN CHINA

Hedgerow technology is recognised by the Chinese Government as an important technology for environmental conservation and it is adopted by a large number of farmers. The hedgerow technology has been recognized by the Ministry of Sciences and Technology, Government of China, and by the Sichuan Provincial Bureau of Science and Technology as one of the prime technologies for extension for environmental conservation and improving agricultural productivity. The Ministry requests this technology to be extended widely. The national collaborating institution of ICIMOD's Appropriate Technologies for Soil Conserving Farming Systems' Project in China, **Chengdu Institute of Botany** of the Chinese Academy of Sciences, has been recognised by the Ministry and the Sichuan Bureau as the sole institution to provide technical support for extension of this technology.

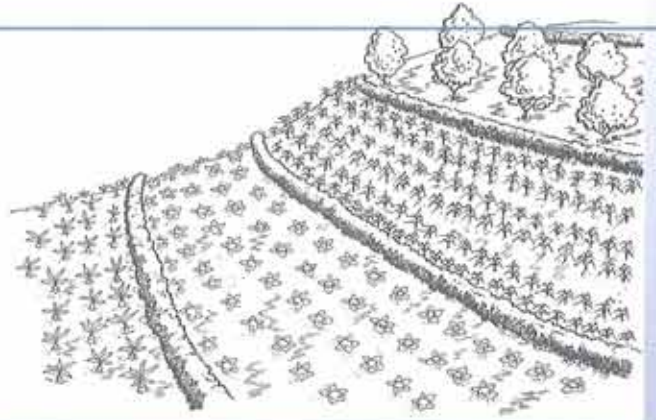
With support from local governments, hedgerow technology has been adopted by a large number of farmers in China. Up to the end of 2000, this technology was extended to around 30 counties in China, and more counties have contacted Chengdu Institute of Botany and ICIMOD for technical support for extension.

The Ministry of Science and Technology, Government of China, has recognised SALT as an important technology and recommended widespread adoption throughout China. The government of Sichuan Province has accepted Sloping Agricultural Land Technology (SALT) as an important technology for extension and requested its wide extension in Sichuan Province. To recognise the achievements of the Appropriate Technologies for Soil Conserving Farming Systems' Project in Liangshan Prefecture, the Government of the Liangshan Yi Autonomous Prefecture of Sichuan Province has awarded CIB and the Government of Ningnan County first prize for scientific and technology development.

The Forestry Bureau of the Liangshan Yi Autonomous Prefecture has made it a policy that hedgerow technology should be applied in the project entitled "slopping farming to reforest steep sloping agricultural land" in 17 counties. This project, which started this year, is one of the most important ones in relation to improving the overall environment of China.

The Provincial Planning Commission of Yunnan Province plans to use SALT in all counties where the bench-terracing project is being implemented. In this respect, it has been decided that a demonstration site will be established in four counties.

CONTOUR HEDGEROW INTERCROPPING SYSTEM



The contour hedgerow intercropping system involves planting double hedgerows of nitrogen-fixing plants along the contour lines on the slope at a distance of from (two) four to six metres. The Space between the contour hedgerows, the alley, is used for agricultural and cash crops.