

The People and Resource Dynamics Project

The First Three Years (1996-1999)

Proceedings of a Workshop Held in Baoshan,
Yunnan Province, China (March 2-5, 1999)

Editors

Richard Allen

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Cover Plate

Kubinde rehabilitation site (front) - B. Shrestha
Collecting fuelwood (China) (back/inside front cover) - PARDYP File Photo
Transporting manure to the fields (India) (back/inside front cover) - PARDYP File Photo
Preparing for plantation (Nepal) (back/inside front cover) - PARDYP File Photo
Women farmers (Pakistan) (back/inside front cover) - PARDYP File Photo

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Foreword

The behaviour of water on mountain slopes, and its interaction with soil as it drains rapidly downwards, provides much of the distinctive determinants of mountain farming systems. The long-term productivity of the diverse agricultural regimes employed by mountain farmers in the Hindu Kush-Himalayas depends on these dynamic and complex water-soil relationships. This nexus is further embedded in wider systems of social, institutional, and economic relations which are, in part, distinctive to mountains—and are themselves undergoing dynamic changes.

The importance of addressing these critical mountain issues led ICIMOD to amalgamate earlier projects on the Rehabilitation of Degraded Land and Mountain Natural Resources into the People and Resource Dynamics' Project (PARDYP). Based on research undertaken by these two previous projects in the middle mountains of Nepal and, to some extent, in other countries of the region, PARDYP was conceptualised in 1996. This new follow-on project is based on regional collaboration throughout the Hindu Kush-Himalaya region. The Swiss Development Cooperation (SDC) joined the International Development Research Centre of Canada in providing funding and intellectual support.

The primary objectives of PARDYP are to provide research for development through understanding the processes of natural resource degradation and through recommending sustainable community and farm-based methods of promoting rehabilitation. The project focuses on improving degraded lands. It examines the impact of natural and man-made interventions on soil fertility and the linkages of these natural factors with the socioeconomic environment in which they are found. The human factor is perceived as the critical basis for future improvements; hence, the project is implemented through a participatory research process in mountain communities.

PARDYP is also an example of the collaborative regional approach taken by ICIMOD in carrying out its mandate for the Hindu Kush-Himalayan region. Research and daily management of project sites is undertaken by collaborating focal institutions in China, India, Pakistan, and Nepal. The participating scientists from these countries are the projects' researchers and the source of its strength. As the central executing agency, ICIMOD is also extremely fortunate in having the help of specialists from the universities of British Columbia

(Canada) and Bern (Switzerland). We are confident that the work carried out by PARDYP will contribute to better management of mountain natural resources and help reduce the spectre of poverty in agricultural communities throughout the Hindu Kush-Himalayas.

J. Gabriel Campbell
Director General, ICIMOD

Forward

20/05

Executive Summary

This document comprises papers presented at the Final Phase I Workshop of the People and Resource Dynamics Project (PARDYP), held in China in March 1999. This project is funded by the Swiss Agency for Development and Cooperation (SDC), the International Development Research Council (IDRC, Canada), and the International Centre for Integrated Mountain Development (ICIMOD). PARDYP Phase I began in October 1996 and ended in September 1999, and has been active at the watershed scale in four of ICIMOD's eight member countries—China, India, Nepal, and Pakistan.

PARDYP is a research for development project which evolved from two previous IDRC-funded projects concerned with investigations into natural resource dynamics and the rehabilitation of degraded areas in the middle mountains of the Hindu Kush Himalayas (HKH). These field studies provided much experience and several important lessons. It was learned that geographical generalisations are not appropriate unless long-term results from replicated tests and trials are available, that water is as important as soils in terms of both dynamics and sustainability, that institutional and policy settings must be supportive in order to obtain sustainable development, and that common methodologies and scientific rigour are of key importance in monitoring biophysical parameters and changes. The PARDYP project was developed during a 1996 planning workshop on the basis of these lessons learnt, the need for longer-term data generation and field study, and the necessity to work more closely with the watershed communities.

The primary objectives of PARDYP Phase I were to provide a basic understanding of the natural resource degradation processes, to recommend proven strategies and programmes for community and farm-based prevention of degradation, and to promote rehabilitation and improved management of the natural resources using five watersheds of the HKH region as an example.

ICIMOD was the central executive agency but the project was undertaken through strong partnerships with many collaborators. Specialists from the Universities of British Columbia (Canada) and Bern (Switzerland) provided technical back-up. In China, India, and Pakistan, focal institutions undertook the day-to-day management of the project in the selected watersheds: the Kunming Institute of Botany in Kunming, China; the GB Pant Institute for

Himalayan Environment and Development in Almora, India; and the Pakistan Forest Institute in Peshawar, Pakistan. Each of these focal institutions identified their own key national partners from other government offices, local NGOs, and grass roots organisations. Project staff members at ICIMOD managed and undertook the activities in Nepal, also alongside a large number of different partners.

In some of the fields of study, for example the hydrological and erosion plot studies, standard methodologies were developed for all five watersheds. In others, greater flexibility was permitted in order that the methods used were appropriate to the customs and traditions of the particular watershed society. In all aspects, emphasis was placed on participatory research and management.

Some common goals were achieved in all the watersheds during PARDYP Phase I. The following were established.

- National core teams, including the identification of key resource partners, institutes, and line agencies
- A basic research network—a total of 27 hydrological stations, 43 meteorological stations, and 23 erosion plots in the five watersheds
- Common land rehabilitation and reclamation areas—14 in all

In addition, the following were carried out.

- Training of local watershed residents in maintaining and monitoring the stations and plots, and managing the common land activities and participatory on-farm research
- Socioeconomic, farming systems, and gender research surveys, as well as PRA training and surveys
- Land use, soil, and geology surveys with subsequent GIS mapping work
- Agricultural and horticultural trials
- Collection of social, economic, and biophysical basic data and establishment of databases
- Production of Annual Yearbooks collating the hydrological and meteorological results
- Analysis of some of the early results of the research

The first three years of PARDYP have given rise to many findings, as documented in the papers in this volume. The five watersheds were found to have both common and individual characteristics, advantages, and problems. The work carried out to date has shown that the major issues common to many of the watersheds in the HKH include the following.

- Population issues leading to land use intensification
- Drinking and irrigation water shortages in the dry seasons
- Problems concerned with soil acidity and widespread soil nutrient deficiencies
- Soil erosion and downstream sedimentation

- Forest degradation, and fodder and fuelwood deficiencies
- The need for more land and the presence of unproductive degraded lands
- Poor agricultural productivity due to poor or non-existent support and insufficient inputs
- Gender inequities and socioeconomic problems due to resource deficiencies and/or mismanagement
- General lack of information—for example, about new and indigenous techniques, appropriate modern farming methods and resource management, and marketing opportunities

The implications of the first three years of PARDYP include the following.

- The hydrometeorological and sedimentation databases require data from several more years of field monitoring to make a significantly useful scientific contribution. These unique databases will be of great benefit in the future to all those concerned in the fields of hydropower, dam design, and flood risk.
- In PARDYP Phase I, sufficient studies have been undertaken to identify a large number of potential initiatives to combat some of the key resource problems affecting the watersheds under study. However, changes do not happen overnight and more time is required to ensure that these initiatives are appropriate in the long term in terms of technology, socioeconomics, community involvement, and equity.
- Much has been achieved in the first three years and a solid foundation constructed, but much still remains to be achieved

A Planning Workshop for Phase II was held in May 1999, and the three major donors have approved the funding of a further three-year Phase II. This extension to the PARDYP project presents many opportunities, and some important recommendations on management of the middle mountains of the HKH can be expected within the coming three years.

Acknowledgements

Many people in the five watersheds and in the many partner institutions in the HKH, and in Singapore, Canada, and Switzerland contributed to the People and Resource Dynamics Project (PARDYP) in its first three years.

In particular, for their continuing and enthusiastic support, special thanks go to Professor Hans Schreier and Dr. Sandra Brown from the University of British Columbia; and Dr. Rolf Weingartner, Dr. Thomas Hofer, and Mr. Juerg Merz from the University of Bern.

Sincere thanks for their support, stimulus, and enthusiasm go to the associated members of the three funding organisations, in particular:

- from the Swiss Agency for Development and Cooperation, Mr Felix von Sury, and subsequently Mr Karl Schuler, in Kathmandu, and Mr. Peter Maag, Ms. Christine Grieder, and Dr. Carmen Thonnissen in Bern;
- from the International Development Research Centre, Dr John Graham, Dr Ronnie Vernooy, and Mr Jean Marc Fleury;
- and from the International Centre for Integrated Mountain Development, Mr Egbert Pelinck (the Director General), Dr Mahesh Banskota (the Deputy Director General), and the many other collaborators from ICIMOD who provided both professional and logistical support.

The papers within these proceedings reflect the breadth of study that has taken place during the first three years of PARDYP, as well as the discussions and deliberations that took place at the Final Workshop in Baoshan in May 1999. Three Annual Workshops were held during the first phase of PARDYP—at Kathmandu in Nepal in 1997, at Almora in India in 1998, and at Baoshan in China in 1999—and special thanks go to all those who spent considerable time and energy in organising these yearly meetings.

The papers also represent a culmination of much hard work in sometimes difficult conditions by many many people. These persons include many of the local residents and farmers of the

five watersheds who have participated in the project as, for example, station readers, site monitors, trial managers, advisors, village organisers, group leaders, extension agents, assistants, and informants. Certain members of the line agencies and local NGOs in the four countries have also contributed considerably to the success of the research and development activities.

Many students from several countries have also played major roles for short periods of time over the last three years—students from China, India, Nepal, Pakistan, Canada, and Switzerland have all contributed significantly to the research studies on the ground.

Last but not least, the work has been carried out and moved on by the substantial efforts of the Country Coordinators and the project field teams in the four countries:

- Professor Xu Jianchu and his team from the Kunming Institute of Botany in China,
- Dr Bhagwati P. Kothyari and his team from the GB Pant Institute for Himalayan Environment and Development in India,
- Mr Pravakar Bikram Shah and his team at ICIMOD in Nepal, and
- Mr Hakim Shah and his team from the Pakistan Forest Institute.

All of the Country Coordinators have been provided with the much valued support of the Directors of their respective institutions—special thanks are therefore due to Dr Lok Man S. Palni of the GB Pant Institute in Almora, Mr Raja Mohammed Ashfaque at the Pakistan Forest Institute, and Dr Hao Xiaojiang at the Kunming Institute of Botany.

List of Acronyms and Abbreviations

$\mu\text{S/cm}$	micro sievert per cm
AAO	ammonium oxalate extraction
ADB/N	Agricultural Development Bank, Nepal
AEPC	Alternate Energy Promotion Centre
BHQ	Block Headquarters
BNWCS	Bhabisy Nirman Women Cooperative Society
CBD	citric bicarbonate—dithionite extraction
CBO	community based organisation
CEC	cation exchange capacity
CIP	Centro Internacional de la Papa
cmol/kg	centimoles per kilogram
CPR	common property resource
CRT/N	Centre for Rural Technology, Nepal
dbh	diameter at breast height
DDC	District Development Committee
DFO	District Forest Office
DFO	Divisional Forest Officer/District Forest Office
DHM	Department of Hydrology and Meteorology of Nepal
DoF	Department of Forestry
DSCWM	Department of Soil Conservation and Water Management
ECOSOC	Economic and Social Council of the United Nations
FAO	Food and Agriculture Organization (UN)
GIS	geographic information systems
GJ	Giga Joules
GPS	global positioning system

HH	households
HKH	Hindu Kush-Himalayas
ICIMOD	International Centre for Integrated Mountain Development
ICS	improved cooking stove
IDRC	International Development Research Centre
IST	Indian Standard Time
IUCN	International Union for the Conservation of Nature
IVI	importance value index
IYM	International Year of (the) Mountains
JCS	Jansachetan Cooperative Society
JKW	Jhikhu Khola Watershed
LRMP	Land Resource Mapping Project
masl	metres above (mean) sea level
MWh	Megawatt hour
NA	not applicable/not available
NARC	National Agriculture Research Council
NEA	Nepal Electricity Authority
NGO	non government organisation
NRs	Nepalese Rupees
PARDYP	People and Resource Dynamics Project
PET	potential evapotranspiration
PRA	participatory rural appraisal
REDP	Rural Energy Development Programme
RET	renewable energy technology
RRA	rapid rural appraisal
R&D	research and development
SC	scheduled caste
SCG	Savings and Credit Group
SDC	Swiss Development Cooperation
SHS	solar home system
TCDC	Technical Cooperation Among Developing Countries
TLU	tropical livestock units
TMI	The Mountain Institute
UN	United Nations
UNCED	The United Nations Conference on Environment and Development
UNDP	United Nations Development Programme

VDC	village development committee
WECS	Water and Energy Commission Secretariat
WUG	women's user group
YKW	Yarsha Khola Watershed

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