Introduction and Objectives

ICIMOD and Its Programme on Environmental Management

The alarming environmental degradation of mountain habitats and the consequent decline in the standard of living of mountain communities in the Hindu Kush-Himalayan Region have been widely recognised over the last two decades. The establishment of the International Centre for Integrated Mountain Development (ICIMOD) about nine years ago was one of the reflections of this growing concern. During its eight-year period of actual operations, ICIMOD has had a good measure of success in functioning as a multidisciplinary documentation centre for integrated mountain development based on the systematic exchange of knowledge and experiences through an organised information network; as a focal point for the mobilisation, conduct, and coordination of applied and problem-solving research activities and for training; as well as a consultative centre to provide expert services on mountain development and resource management to the countries of the HKH Region.

ICIMOD's programme on Environmental Management is aimed at responding to the challenges of ecologically sustainable development of mountain environments. The main programme development activities have focussed on the Rehabilitation of Degraded Lands: Watershed Management, Mountain Hydrology, Landslides, and Biodiversity.

The Nature of the Problem

Mountains are an important source of water, energy, and biodiversity; they are a source of minerals, forest products and agricultural products, and of recreation. As a major ecosystem representing the complex and interrelated ecology of our planet, mountain environments are essential to the survival of the global ecosystem. Mountain ecosystems are, however, rapidly changing. They are susceptible to accelerated soil erosion, landslides, and rapid loss of habitat and genetic diversity. On the human side, there is widespread poverty among mountain populations and a loss of indigenous knowledge. As a result, most global mountain areas are experiencing environmental degradation.

The Hindu Kush-Himalayan Region, ICIMOD's mandated region, sustains approximately 150 million people from the eight countries of Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. The lives of about three times that number of people are affected in the plains and river basins below. The hilly and mountainous areas of all these countries are caught in a vicious circle of underdevelopment - poverty, high population growth, environmental degradation, and deteriorating development prospects.

Degradation of mountainous ecosystems is a global problem, and the Himalayas constitute one of these threatened ecosystems. Environmental degradation in the Himalayan region is basically a product of human intervention into the uses of the various elements of natural resources, namely, land, forests, pastures, water, and minerals. The scale and dimensions of degradation have been further enhanced by ecological sensitivities, or fragilities, to disturbances, and the consequences of disturbance are often irreversible. The mountains of the Himalayas, which make vital contributions to agricultural production, are threatened by cultivation of marginal lands due to an expanding population; in many areas this is accompanied by excessive livestock grazing, deforestation, and loss of biomass cover.

Any type of land resource can be destroyed by inappropriate management practices, and rehabilitation of damaged land is easy in some cases and more difficult in others. Sloping lands with thin layers of topsoil, such as those found in mountain areas, with high intensity rainfall or high speed winds, are more difficult to rehabilitate when mismanaged than, for instance, lands with deep fertile soils on well-drained plains. Increased soil erosion, decreasing land productivity, frequent landslides, loss of biodiversity, and eventual desertification and abandonment are some of the commonly encountered land degradation problems in mountain areas.

Insofar as human interventions influencing land use in mountain areas are concerned, there are many. Population growth is often cited as a cause of land mismanagement, particularly in circumstances in which a rapidly increasing population has few non-land based income and employment opportunities. If commercialisation of agriculture is seen to be economically desirable, it is also being realised that technologies accompanying such commercialisation in mountain areas have overlooked resource degradation aspects

almost completely. In addition there are also complications arising out of tenurial arrangements that govern incentives and disincentives affecting resource conservation and exploitation. Inappropriate development policies also play an important role in determining how land is used - particularly in the context of how much degradation is permitted before concrete and corrective steps are undertaken.

The impact of land degradation extends very deeply into the economy and the environment. On public lands, the immediate impact is the loss of forest cover which directly affects fuelwood and fodder supply and, through changes in livestock output, influences household food and income levels. On private lands, the impact is seen in terms of lower output of different land-based products. The long-term effects on the ecosystems are even greater, resulting in irreversible loss of productive resources, options for survival, and habitable environments. While these are on-site effects, the off-site impacts of increasing land degradation and its economic consequences in mountain areas have not been given much attention so far.

The Need for Viable Solutions

In most areas of the HKH showing signs of land degradation, it is usually small farmers who are suffering. Given their extremely poor resource base, it seems sensible to argue that small farmers do not willingly destroy the basis of their survival. The search for solutions must therefore begin from an understanding of the land user's decision regarding the allocation of resources. Unfortunately the knowledge basis in this respect is very poor. Unless better understanding is developed of the users' perspectives and the options available, solutions are unlikely to be sustainable. Among the principal foci of this programme are the following: to systematically identify and document the land degradation problem, to make a comparative study of farmer options, and to identify land rehabilitation options in different mountain ecosystems.

The issue of land resource management is not just an environmental problem. If the problem can be traced back to basic economic, demographic, cultural, and technological forces, its solutions also lie in improved management of available natural resources, an efficient and productive farming system, a rapidly expanding infrastructural base, and expansion of non-agricultural employment opportunities such as tourism. Thus, in addition to improved land resource management activities, many of the solutions for better land resource management must come from inputs provided by other programmes. The Mountain Environmental Management Programme of ICIMOD focuses on some of the important natural resources of mountain areas, such as land, forests, water, watersheds, and biodiversity, in order to examine the problems and potentials of integrated mountain development.

Project on Rehabilitation of Degraded Lands

This project is to examine comprehensively the problems of degraded lands in different mountain ecosystems of the Hindu Kush-Himalayan Region. It's main objectives are:

- to develop a better understanding of the extent, forces, and processes underlying land degradation and
- to identify measures for restoring and developing degraded lands in different mountain ecosystems, by using options that are field tested and found to be economically, environmentally, and socially viable.

Alternative approaches to solving degraded land problems can be divided into three basic categories.

- Direct interventions in degraded lands, focussing on various types of land maintenance activities, changes in land use, and many other related on-site activities affecting soil erosion, land productivity, etc.
- Indirect interventions such as those dealing with development of suitable technology, reforms in land holding and tenurial structures, reducing population pressure, land use planning, and policy-related incentives or disincentives for promoting desirable land use.
- Interventions outside degraded lands focussing on off-farm employment, intensification of land use in other more suitable areas, and reduction of off-site impacts.

The role of any one of these three will vary from place to place, but all three of these should be carefully considered. Obviously, for on-site developments, the direct interventions are important and will account for all of the field work. The need for careful understanding of how farmers are using their land resource and the prevailing limitations to changes become critical when we consider alternatives. The other two types of intervention become more relevant when one is considering the long-term sustainability of land use. If policies continue to encourage mismanagement, any amount of on-site improvement will become ineffective after

some time. If alternative off-farm employment opportunities are not available, the growing population will increase pressure on limited land resources. It is therefore important to understand the need for and role of all these different types of interventions.

Activities

- Identification of Degraded Mountain Ecosystem Sites and Collaborating Institutions

  So far, four of the five research sites have been identified for purposes of the project. The sites were selected on the basis of ongoing land degradation and the extent to which it can be restored. Details on the sites are given in Table 1.

- Workshops

  In view of the wide heterogeneity of mountain ecosystems, including major differences in socioeconomic processes, it was considered to be very useful for collaborating agencies to meet and discuss alternative approaches to the problem. The first workshop was organised with this objective and discussed and recommended methodologies to be followed by participating institutions. A second workshop is expected to be held at the end of the programme in order to discuss the important findings and to put together a proposal for a training programme in techniques for restoring degraded lands, based upon the inputs developed in this Phase.

- Field-Work Based Case Studies

  Each of the participating countries/institutions representing different types of mountain ecosystems have selected sites that are considered to be degraded. The sites are being carefully studied for their current social, economic, and environmental characteristics. A systematic land use picture will be developed with the identification of different agroecological zones and their potentials for use. Over a three-year period, steps will be taken to improve land conditions. The measures will vary from place to place. All decisions and activities will be carefully monitored. A comprehensive case study will be prepared by a multidisciplinary team in Godavari (ICIMOD Headquarters' Complex). ICIMOD will also use its site in Nepal for directly organising and coordinating such a field-based case study. These case studies will be extensively discussed during a Workshop meeting to be organised at the end of the project.

- Development of Training Materials for Restoration of Degraded Lands in Mountain Areas

  Findings from programmes such as this, based upon evaluation of farmer activities and field testing of alternatives, provide a good basis for developing sustainable land use programmes and policies. These will have important implications for programmes in agriculture, forestry, watershed management, and many other sectors. One of the best ways of promoting useful ideas and techniques for improved land management will be through regular training programmes, either at a regional level or in specific countries. Such a training programme will be based upon inputs provided by the case studies. The second workshop will discuss this issue extensively and will provide a basis for developing a training programme on the restoration of degraded lands.

  Materials for dissemination purposes will focus on publication of relatively simple handbooks, video films, poster-pictures, and slides. The training programme itself, however, can be undertaken only at a later phase and not during this grant period.

Duration of the Study and Complementary Activities

The study covers a period of 36 months, starting from May 1992. After some preliminary work, based on available literature and information, was completed, field surveys were conducted by the project coordinators.

The methodology workshop reviewed the methods and approaches proposed here in the light of existing gaps in information and discussed and determined upon country specific issues and options to be explored in the country studies. Technologies and approaches for field-work based studies in different mountain ecosystems, which are considered to represent different degraded land types, were deliberated upon at the workshop.

Country collaborating institutes have initiated implementation at the selected sites. With the local people's active participation, the team will develop the experimental system(s) for implementation at the degraded land sites. Planting activities will begin in June 1993. Management and monitoring of the rehabilitation process on experimental trial

plots will be conducted during the two years after planting.

Expected Output

- Project Implementation Report
  - -Annual Progress Report
  - -Final Report
- Five Case Studies (4 country + ICIMOD)
- Two Workshop Reports
- Dissemination Materials such as Video Film (I), Poster Pictures, and Slides showing methods of restoring degraded lands in mountain areas.

Collaborating Institutions and Field Sites

The programme is being supported by a grant from the International Development Research Centre (IDRC), Canada. The research is being carried out in collaboration with institutions in China, India, Nepal and Pakistan.

Country-wise Collaborating Institutions for the Project are as follows.

China

- Kunming Institute of Botany, CAS
- Kunming Institute of Ecology, CAS
- Chengdu Institute of Biology, CAS

India

- G.B. Pant Institute of Himalayan Environment and Development, Almora, Uttar Pradesh

Nepal

- Users' Groups of Degraded Forest Lands, Kavre-Palanchowk District,
- Kavre Palanchowk District Forest Office, Bagmati Zone

Pakistan

- Pakistan Forest Institute, Peshawar

Field Sites in Four Countries of the HKH Region

Field sites for implementing action-research/demonstration on rehabilitation of degraded lands in different types of mountain ecosystems in the region have been selected in close consultation with, and through the active cooperation of, the local people/collaborating institutions/local authorities in China, India, Nepal, and Pakistan, as shown below.

Proposed Tasks for the Workshop

The objectives of the workshop were to: (1) Reflect on project-initiated activities and assess the current status of land degradation in mountain ecosystems in the HKH Region; (2) discuss methods and alternative approaches identified for each of the case study areas of the project; and (3) develop a detailed 2-year action plan for implementing the project in participating countries of the project.

Table 1: Field Sites

Country	China	India	Nepal I	Nepal II	Pakistan
• Name of Site and Location	• Damai Village in Baoshan of Yunnan alt. 1,380-1,526m	• Kausani in Almora U.P. alt 1,600-1,800m	• Godavari in Lalitpur of Bagmati 1,600m	• Panchkhal in Kavre-panchkhal of Bagmati 900-1,000m (2 separate sites)	• Five field sites have been surveyed in April and one site among the five will be decided upon by the concerned collaborating institutions
• Land Area for Planned Activities	• 150 ha sloping land	• 30 ha sloping land	• 3 ha sloping land	• 24 (7+17) ha sloping land	
• Land Ownership	• Community degraded lands and marginal farming lands	• Community degraded lands and institute demonstration land	• 3 ha sloping land at Godavari site under ICIMOD management	• Community degraded forest land	