ICIMOD

# ANNUAL REPORT 1989

INTERNATIONAL CENTRE FOR INTEGRATED MOUNTAIN DEVELOPMENT

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# ANNUAL REPORT 1989

## International Centre for Integrated Mountain Development

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# Foreword

This is ICIMOD's first annual report, although the Centre has been in operation since 1984. However, when a new organisation is born the early years are, of necessity, full of trial and error in the search for a meaningful role and organisational structure that will serve it for a longer period of time.

Roles, too, change with changing circumstances. It is this that makes 1989 a benchmark year. From 1984 to 1988 the work of ICIMOD was mainly involved with laying the foundations for an institution; an institution that would serve the function of identifying the parameters for sustainable and integrated mountain development in the Hindu Kush-Himalayan Region and of helping to design solutions to technical problems and institutional issues. Therefore, although this is the annual report for 1989, it deals also with the years that led up to the benchmark year and some of the activities that contributed to the development of ICIMOD's functions within the broad definition of objectives laid down by the Centre's mandate.

ICIMOD is the first International Centre for Integrated Mountain Development, and, as such, it steered a hitherto relatively uncharted path in the very beginning. It is by 1989 that ICIMOD, through its different programmes, was able to look back on a number of achievements, clarify its overall focus, and plan more specifically for the future. One might say that 1989 was the year when "institutionalisation" took root.

During its formative years, ICIMOD has grown from a Centre dependent upon traditional research mechanisms to one that is growing ever more competent in the modern communication and information techniques. Within a five-year period, ICIMOD reached a position where it was able to initiate the establishment of a computerised Mountain Environmental and Natural Resources Information System. The mechanisms for the full operation of this technological system will be firmly in place by the end of 1990.

A number of events marked 1989.

i) In January, ICIMOD received a visit from Professor Federico Mayor Zaragoza, the Director General of UNESCO. At this time, closer cooperation and possible support by UNESCO through UNDP were discussed.

ii) In February, a Mountain Farming Systems Workshop was held in the Swat Valley of Pakistan. This was the fourth in the Mountain Farming Systems Workshop Series.

iii) From February to April, ICIMOD held its first major training programme "Pilot Training Programme on Risk Engineering in the Mountains." The programme lasted for ten weeks and was attended by 20 experienced engineers from Bhutan, China, Nepal, and Pakistan.

iv) In April, an International Symposium on Mountain Environmental Management was jointly organised by ICIMOD and UNESCO/MAB.

v) In June, International Expert Meetings on Horticulture and Apiculture were held. These workshops provided useful inputs to the adjustment of farming systems in hill and mountain regions.

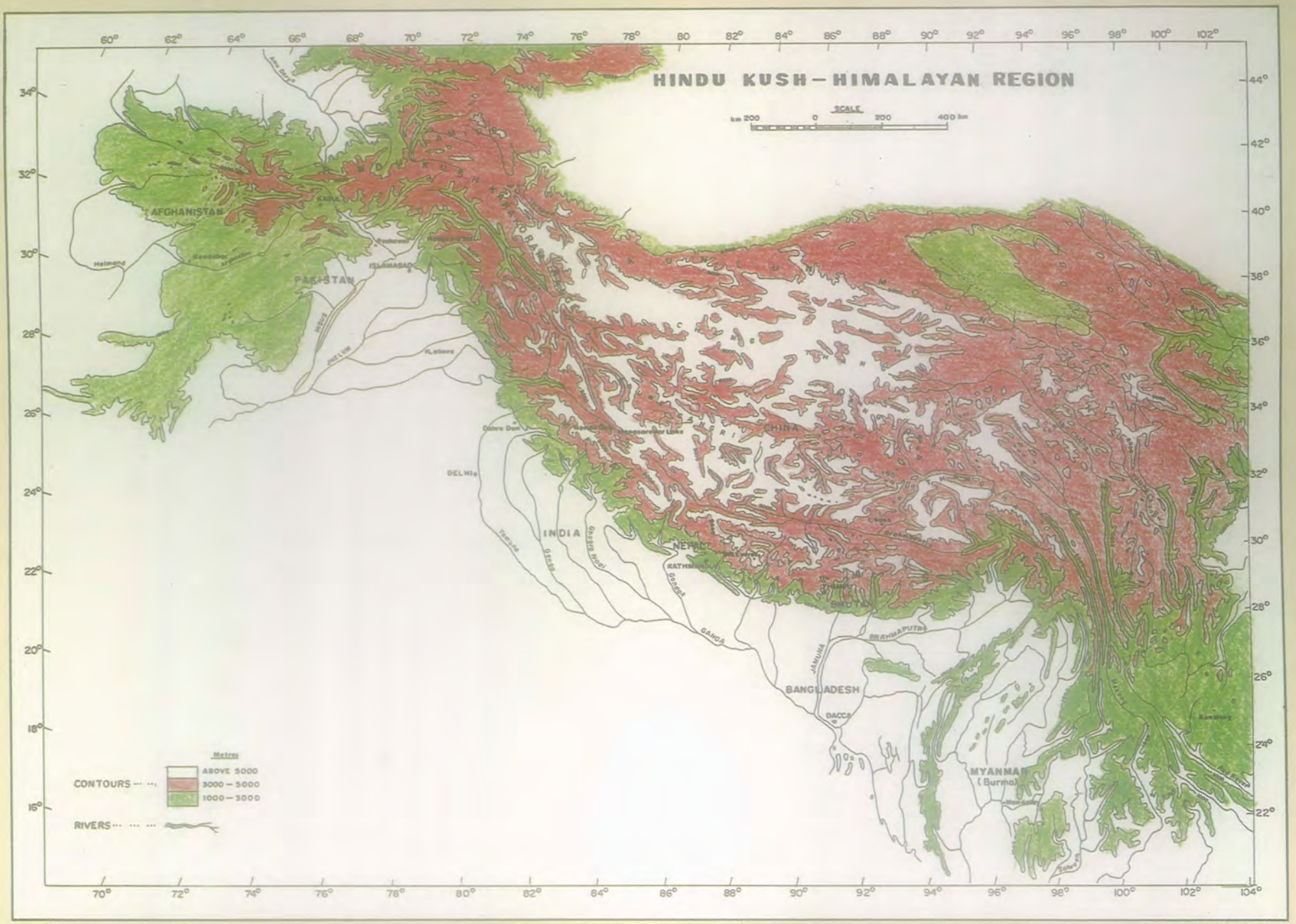
vi) From 11th to 14th of December, a Regional Workshop on the Hydrology of Mountainous Areas was held by ICIMOD together with the Department of Hydrology and Meteorology of HMG, Nepal, and UNESCO.

vii) The Twelfth Board Meeting was held in Thimphu, Bhutan, and this was the first time that the Board, as a whole, met outside the headquarters. ICIMOD bade farewell to its first Director, Dr. Colin Rosser, and welcomed his successor.

viii) The Board of Governors decided to review the first five years of the Centre's operations. Therefore, an outside Quinquennial Review Panel was appointed to begin work in February, 1990

Just as 1989 was a benchmark year for ICIMOD, this annual report, too, is significant as it is the first of our regular annual reports. In this present report, we have attempted to elaborate the rationale behind the establishment of ICIMOD as well as the issues and challenges for mountain development. It also outlines the objectives and focus of ICIMOD and provides some idea of the work needed in the future. Through regular publication of annual reports, the Centre will keep its supporters and clients informed about its activities and achievements as well as the prospects and challenges of mountain development.

E.F. Tacke
Director


HINDU KUSH – HIMALAYAN REGION
SCALE
km 200 0 200 400 km
AFGHANISTAN
PAKISTAN
ISLAMABAD
CHINA
INDIA
NEPAL
BANGLADESH
DACCA
MYANMAR
(Burma)
DELHI
Helmand
Indus
Jhelum
Ganges
Brahmaputra
Jamuna
Irrawaddy
Metres
ABOVE 5000
3000 – 5000
1000 – 3000
CONTOURS
RIVERS

# The ICIMOD Region

**The beauty of these mountains hardly reveals the socioeconomic implications of a degraded environment where the ecological balance is increasingly difficult to maintain against the growing population which has now exceeded the carrying capacity of cultivable land.**

Today, there is deep concern about a series of social and environmental problems in our overall concern for sustainable development which is defined by the World Commission on Environment and Development (WCED 1987) as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*".

*Encroaching Deforestation (T. Partap)*

The components of sustainable development are equity, environmental sustainability, and economic growth. In the context of the Hindu Kush-Himalayan Region, these issues are related to agriculture, forestry, livestock, urbanisation, infrastructure, and a host of other interlinked issues. Analysis of these problems has been difficult because of a variety of geographic and temporal factors within this Region. While, at one end of the scale are issues involving food and forest production, marketing and manufacturing, and maintenance of sustained production systems, at the other end are locally specific issues which farmers face in eking out a living amidst meagre resources. Between these extremes are policy and practice issues and the critical issue of organisation and management for a more constructive partnership between government and the local community in order to facilitate the rational management of natural resources in these mountains.

This aspect is important because the Hindu Kush-Himalayan (HKH) Region sustains approximately 150 million people and affects the lives of more than three times that number in the plains and river basins below. It is not only the world's highest mountain region, but also its largest and most complex. It extends over a distance of 3,500 km, from Afghanistan in the West to Myanmar in the East, and ranges from the Tibetan Plateau of China in the North to the Ganges Basin of India in the South. Physically, this macro-region contains the upland watersheds of major river systems; including the Indus, the Ganges, the Brahmaputra, the Nu-Salween, the Lacang-Mekong, and the Yangtze (Jinsha). The climate ranges from semi-arid in the west to wet tropical, with excessive summer monsoon rainfall in the east. The physiographic features change vertically from the tropical lowlands to the densely populated and intensively cultivated middle hills with climates that range from subtropical to cool temperate. At still higher elevations, alpine meadows and high altitude deserts with permanent snow and glaciers are found.

Of the eight HKH countries, Afghanistan, Bangladesh, Bhutan, China, India, Myanmar (Burma), Nepal, and Pakistan, three countries; namely Afghanistan, Bhutan, and

Nepal; are land-locked. Five countries; namely Afghanistan, Bhutan, Nepal, Bangladesh, and Myanmar; have per capita incomes below $ 200 (U.S.), thus belonging to the category of Least Developed Countries; and the three remaining countries (China, India, and Pakistan) are also among the low income developing countries. Thus all the countries of the Region, and in particular their hilly and mountainous areas, are seriously disadvantaged and at a low level of development. They are caught in a vicious circle of underdevelopment - poverty, high population growth, environmental degradation, and deteriorating development prospects.

*Slums in Mountain Areas (M.T. Shah)*

International cooperative action is essential to develop and fully utilise available resources, such as hydro-electric power and irrigation potential, for the welfare of the people of the Region. The physical, biological, and even socioeconomic interaction between the highlands and lowlands make a strong case for joint bilateral and multilateral endeavours for development. At the same time, improved means for the exchange of goods and the sharing of skills must be developed and differing cultural values understood and appreciated.

Reversing downward trends in environmental quality and resource potential, and in the socioeconomic situation of mountain populations, requires a comprehensive and integrated approach. The assessment of opportunities and constraints has to be comprehensive, covering all sectors to facilitate sound decisions on the choice of alternatives, to achieve optimisation of resource use, to procure higher incomes for the population, and to ensure environmental stability. A multidisciplinary approach is essential to develop and implement new production technologies and an improved management system for sustainable development. It is this realisation that led to the establishment of the International Centre for Integrated Mountain Development in December 1983.

*The ecological and developmental problems of the Hindu Kush-Himalayan Region transcend national and administrative boundaries, as the watersheds of major river systems are vast and cover large extents of land. Joint action is needed to deal effectively with the destructive forces of nature and the unplanned or shortsighted interventions of man.*

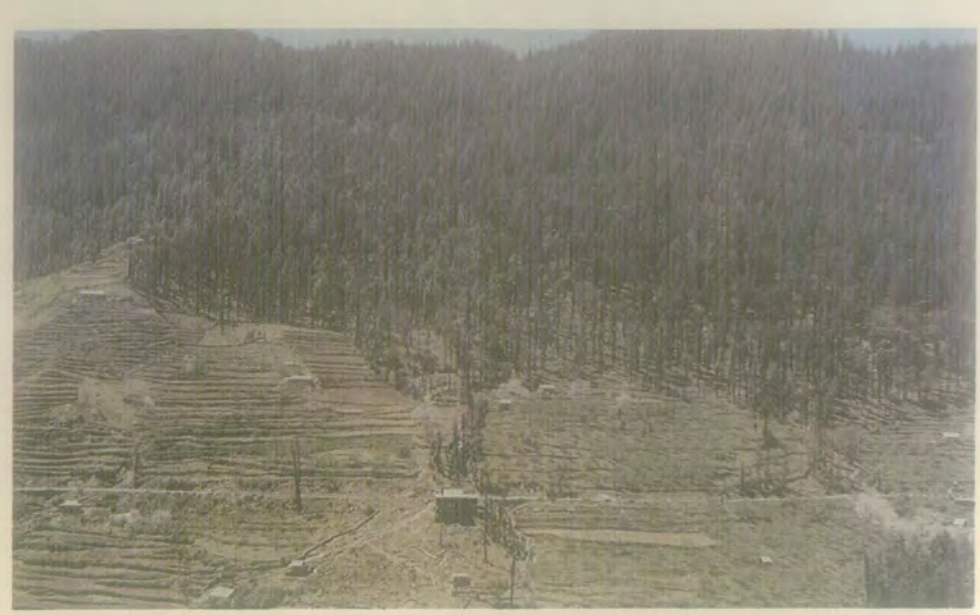
# The Centre

**ICIMOD came into being out of widespread recognition of the alarming environmental degradation of mountain habitats and consequent increase in impoverishment of mountain communities in the Hindu Kush-Himalayan Region.**

## The Creation of ICIMOD: Milestones

### *The Idea*

In December, 1974, the German Foundation for International Development held an international workshop in Munich on the development of the mountain environment. The workshop recommended the establishment of an institution in Nepal to promote an ecologically sound development process in the mountain regions. In 1975, UNESCO, within the framework of its programme on Man and the Biosphere (MAB), organised a regional meeting in Kathmandu on integrated ecological research and training needs in the mountain systems of Southern Asia, particularly in the Hindu Kush-Himalayas. The delegates, who represented most of the countries of the Region, strongly recommended the founding of a regional institution to focus on documentation; promotion of research and training in integrated mountain development; and technical advisory services.



*Forest Encroachment: A Typical Problem of the HKH Region (T. Partap)*

### *The Place*

The Kingdom of Nepal offered to establish the proposed institution in Kathmandu at the UNESCO/MAB regional meeting in 1979 and this offer was welcomed. Subsequently, three other parties --- UNESCO, the Government of Switzerland, and the Federal Republic of Germany --- played an integral part in the eventual establishment of the Centre.

### *The Sponsors and the Agreement*

In 1979, along with His Majesty's Government of Nepal, three parties agreed to act as founding sponsors of ICIMOD. *An agreement* providing the legal basis for this *international autonomous centre* was signed *in Paris in September 1981* by the Government of Nepal and UNESCO. The governments of the countries of the Hindu Kush-Himalayan Region (Afghanistan, Bangladesh, Bhutan, the People's Republic of China, India, Myanmar (Burma), Nepal, and Pakistan) endorsed the efforts of the four sponsors at several sessions of the UNESCO General Conference.

### *Inauguration*

The Centre was inaugurated in December 1983 and work began from September 1984. ICIMOD is listed as one of the "non-associated centres" of the Consultative Group on International Agricultural Research (CGIAR).

## ICIMOD'S OBJECTIVES AND FUNCTIONS

**"The primary objectives of the Centre shall be to help promote the development of an economically and environmentally sound mountain ecosystem and to improve the living standards of mountain populations of the Hindu Kush-Himalayan Area which, for the purpose of these Statutes, includes Afghanistan, Bangladesh, Bhutan, China, India, Myanmar (Burma), Nepal, and Pakistan."** (ICIMOD's Statutes, Article 1, 1983)

ICIMOD was neither intended to be a traditional research institution nor an implementor of development. Rather, ICIMOD's intended role can perhaps best be described as that of a facilitator of development with four main functions. These are:

i) a multidisciplinary documentation centre on integrated mountain development based on the systematic exchange of knowledge and experiences through an organized information network;

ii) a focal point for the mobilization, conduct, and coordination of applied and problem-solving research activities;

iii) a focal point for training on integrated mountain development with special emphasis on the assessment of training needs, the development of relevant training materials based directly on field case studies; and

iv) a consultative centre to provide expert services on mountain development and resource management to the countries of the HKH Region.

*Speakers at the First International Symposium on the occasion of ICIMOD's inauguration brought out forcefully the evidence of natural and man-made pressures on the fragile mountain environment. They also pointed out the apparent insensitivity amongst decision-makers about radical steps required to face the challenges of this "Promethean struggle"*

To meet these challenges, a mandate was prepared and by *September, 1984, the operational phase began.*

There were two immediate objectives:

- to get the Centre organised and operational quickly and
- to build a sound "knowledge-base" and to establish working relationships with research institutions and government departments and agencies throughout the Region as well as with international centres and donor agencies.

*Four subject areas were selected for primary focus*: Watershed Management, Rural Energy Planning, Off-Farm Employment Generation, and Rural-Urban Linkages. Two other subject areas that were covered, but not with the same intensity as others, included: People and Protected Areas and Mountain Crop Genetics.

The period from 1984 to 1988 was characterised by searching for an *ICIMOD "niche"* or comparative advantage in the field of integrated mountain development. The form that the search took did not remain static throughout these years. However, certain emphases did emerge.

### The Emphases

The operational mechanism for conducting the state-of-the-art reviews was based heavily on the principle of *regional cooperation*. Professionals, mostly from the Hindu Kush-Himalayan Region, and some from outside, were requested to be directly involved in the review of principal issues and options on related themes. The participants in this collective exercise included *senior government officials, researchers from academic institutions, implementors involved in specific programmes and projects, and donor representatives from bilateral and multilateral agencies.*

The role of ICIMOD professionals was to act as catalysts by formulating the overall framework of the required undertaking, identifying appropriate resource people for various tasks, and ensuring that a comprehensive range of issues, options, and constraints were forthcoming.

For an integrated outlook on any particular theme, *national workshops* were organised in collaboration with host country institutions to discuss papers written by various authors and generate a comprehensive review of the issues, options, and constraints on a national scale. Subsequently, *international workshops* were organised by ICIMOD in collaboration with other agencies and institutions in order to establish the differences and similarities in various parts of the Hindu Kush-Himalayan Region.

*The principal objectives in these workshops were to identify key priorities for concerted action, nationally and internationally, and also to work out a networking mechanism for information exchange, regional cooperation, and continued partnership.*

Out of these exercises a number of emphases emerged. Three of these emphases; namely, *problem foci, systematic perspective*, and *transformation processes*; are interlinked. The crucial problems such as "rural energy planning", "rural urban linkages", "watershed management", and "off-farm employment" were seen not only in the light of transformation processes, in terms of deforestation and the need for alternative energy options; migration from rural areas and overcrowding in big cities; degradation of the mountain environment and the need for alternatives to farming, at the micro-level, but also from the macro-perspective of national planning, greater public intervention, growth of roads and communication schemes, and the penetration of the market economy into the subsistence agricultural system. For example ICIMOD's Workshop on Watershed Management reached the following conclusion.

*"The first priority at the national level is to develop long-term plans to examine watershed problems within the national development context and pay particular attention to supporting policy measures, such as encouraging decreased population growth, increasing off-farm income, promoting development and use of alternative energy sources, and the mitigation of the negative environmental effects of other development activities such as road building, urbanisation, and commercial agriculture"*. Such perspectives were apparent in all the activities of ICIMOD.

The *dimensions of diversity*, physically and socially, constituted another feature that was constantly emphasised in ICIMOD activities. The verticality of the mountains creates an obvious diversity. In addition, the ecology in the Hindu Kush-Himalayas, from east to west, ranges from tropical rainforests via temperate habitats to arid deserts. Culturally, politically, and administratively, too, there are many differences. These were reflected in the commissioning of studies and reviews from different parts of the Region. For example, rural-urban linkages were discussed in light of specific towns including Thimphu, Kathmandu, and Lhasa; and specific valleys such as those of Dun, Kashmir, and Swat. *While recognising the diversity as mentioned above, the search was also for commonality in problems, in experiences, and in effective approaches that could be shared by decision-makers, practitioners, and researchers.* Examples include: the marginalisation of mountain people and communities and the benefits accrued to outsiders at their cost during the course of development interventions; the implications of the rhetoric in decentralisation policies and the experiences with "integrated rural development projects"; the need for increasing the carrying capacity of mountain habitats; and others.

There was also an emphasis on *technical and management options*. Although there was a general realisation in development dialogue about the need for "appropriate technologies", the concern was that the options that fit into mountain norms and specifications were extremely limited. Furthermore, in spite of huge development investments in the Hindu Kush-Himalayan Region, the lack of proper management has made them relatively ineffective in ensuring that the benefits are enjoyed by mountain

populations. The search for technical options was exemplified by the emphasis, among others, on risk minimisation in infrastructural development, promotion of end use planning in micro-hydropower development, and analyses of terracing techniques in mountain agriculture. With regard to management options, the stress was on the inclusion of beneficiaries' perspectives in programme development and implementation, the necessity for management innovations with due consideration of indigenous institutions and sponsored institutions in resource management, and the operationalisation of decentralised policies for effective district administration and programme implementation.

Another point worthy of note is the *integration of diverse professional skills* for addressing area-specific and problem-specific issues.

*The engagement of ICIMOD's own professionals was deliberately based on this approach. Physical and biological scientists had to interact with social scientists. At the same time, implementors, planners, researchers, and other collaborators were persuaded to contribute their respective points of view.*

The premise was that this would help towards a better understanding of the problems in question and the possibility of generating more appropriate, practical and technical management options for mountain development.

## The Divisions

The divisional structure for programme development and execution came into effect in 1987, following the completion of the state-of-the-art reviews and the organisation of international workshops on the subject areas mentioned above. The four programme areas consisted of:

(1) Mountain Farming Systems,

(2) Mountain Environmental Management,

(3) Mountain Infrastructural Development (currently Mountain Infrastructure and Technology), and

(4) Mountain Institutional Development (currently Mountain Population and Employment).

In addition to the operational mechanisms followed during the first three years; namely, state-of-the-art reviews, regional cooperation, and national and international workshops, there are several distinguishing features that are prominent in the subsequent years. The first such feature is the emphasis placed on field studies in all the "core programmes".

*The basic premise here has been that generalities about mountains alone are inadequate to provide an understanding of the dynamics of the ongoing processes in real life.*

This is critical, particularly when new concepts and methods are being tried or tested. These case studies were conducted by ICIMOD professionals and national collaborators at village, district, and regional/valley levels.

Another very important feature is the design of materials/manuals for *training of trainers* and testing them in pilot training courses. Two programmes are noteworthy from this point of view. The first is that of District Energy Planning and Management and the second is Mountain Risk Engineering.

The third feature is the *Senior Research Fellowship*. The basic objective here has been to encourage senior professionals from the Region to engage in "exploratory thinking" about alternative dimensions of Integrated Mountain Development. This has led to the publication of "Rangeland Management in Pakistan", "Development Ecology of the Arun River Basin in Nepal," and "Impact of Tourism Development in Mountain Areas: A Case of Manali in the Kulu Valley (Himachal Pradesh)." Another five publications are forthcoming.

## "The Niche"

By 1989, ICIMOD had advanced a great deal in terms of conceptual clarity; in finding the ICIMOD "niche". The conventional approach to mountain areas was found to be ineffective and less relevant because it was not sensitive to mountain conditions. An alternative conceptual framework is evolving for which mountain specificities, such as inaccessibility, fragility, marginality, diversity, 'niche', or comparative advantages, of the mountains, and human adaption mechanisms, and their interrelationships, are central. They constitute a compelling basis for a resource-based integrated approach to mountain development.

## Looking Forward

This understanding can now be used to design future programmes at ICIMOD and will facilitate the cause of advocacy for integrated mountain development in member countries; opportunities will also arise to evolve inter-country comparative perspectives. ICIMOD is now in a position to undertake the advocacy and action role with greater competence and confidence.

For effective operation, ICIMOD staff will interact more closely with national professionals from the participating countries and maintain sustained partnerships on a long-term basis and not only on a project basis.

The style of implementation of these work programmes is based on ICIMOD's comparative advantage as an international centre and with the purpose of supplementing the ongoing efforts of local and national institutions to consolidate efforts in programmes of relevance to mountain areas.

### ICIMOD WORKSHOPS AND PUBLICATIONS* (AS OF DECEMBER 1989)

*International Symposium and Inauguration, Kathmandu, Nepal, December, 1983.*

**PROCEEDINGS OF THE SYMPOSIUM**

Mountain Development: Challenges and Opportunities
December 1-5, 1983.

**SENIOR FELLOWSHIP SERIES**

Rangeland Management in Pakistan
Noor Mohammad - 1989.

Development Ecology of the Arun River Basin in Nepal
T.B.S. Shrestha - 1989.

Impact of Tourism Development in the Mountain Areas:
A Case of Manali in the Kulu Valley
T.V. Singh - 1989.

**BOOKS**

Rural Energy Planning in the Indian Himalaya
Editors: T.M. Vinod Kumar and Dilip Ahuja, 1986.

Erosion and Sedimentation in the Nepal Himalaya
V. Galay, May, 1987.

**ICIMOD NEWSLETTERS**

Series 1 to 11

**OCCASIONAL PAPERS**

Numbers 1 to 14

* Workshops and Publications belonging to specific Programmes are listed under them.

# ICIMOD Work Programmes

# ICIMOD Work Programmes

In order to address the problems of mountain development, it is necessary to create awareness among policy and decision-makers about development issues and the appropriate solutions to these issues. This would require the acquisition of knowledge about problems and their solutions and their subsequent dissemination to planners and implementors of development and to farmers and entrepreneurs at the grassroot level. Thus, broadly, the functions of ICIMOD are two-fold.

A. The Mobilisation of Knowledge.

B. The Dissemination of Knowledge and Skills.

## A. The Mobilisation of Knowledge

*The acquisition of relevant knowledge concerning mountain development is ICIMOD's most important activity.* ICIMOD evaluates and integrates this knowledge and experience and disseminates its assessments and recommendations. Knowledge is acquired through published and unpublished reports from national and international research institutes; through project agencies; and through ICIMOD's own knowledge reviews, case studies, seminars, and workshops.

The collection of knowledge at ICIMOD is organised into four thematic research development programmes; viz. (i) Mountain Farming Systems; (ii) Population and Employment; (iii) Infrastructure and Technology; and (iv) Environmental Management.

The four thematic research programmes collectively cover all the important aspects that need to be considered in promoting the development of an economically and environmentally sound ecosystem and to improve the living standards of mountain populations.

## B. The Dissemination of Knowledge and Skills

*Information dissemination and concerted action to influence policy and programmes towards integrated mountain development are ICIMOD's second major area of activity.* The four dissemination programmes which reinforce the thematic research programmes and are responsible for their effective application are (v) Documentation and Information Exchange; (vi) Natural Resources Assessment and Monitoring; (vii) Area Development Planning and Implementation; and (viii) Institutional and Professional Development.

The four dissemination programmes are all distinctly service-oriented and directly meet the mandated objectives set for ICIMOD in Article 1 of its Statutes. The services provided are in the form of raw and repackaged information; computer-processed data and maps; policy and planning advice; training manuals; skill training; and advisory activities. The programmes also depend heavily on modern communication technologies and will reach their full efficiency and effectiveness only after the full computerisation and networking of different work stations.

*To fulfill its mandate, ICIMOD needs the strong cooperation of national institutions in the Region. ICIMOD's role is mainly that of a catalyst working for and through national research and development bodies. Similarly, linkages with international research and development organisations need to be strengthened in order to aquire and disseminate the relevant knowledge and skills.*

# ICIMOD WORKPLAN FRAMEWORK

## Thematic Research and Development Programmes

### I — MOUNTAIN FARMING SYSTEMS

- FARMERS' STRATEGIES AND RESPONSES
- AGRICULTURAL TRANSFORMATION PROCESSES AND FORCES
- SCIENCE AND TECHNOLOGY, R&D, GENETIC RESOURCES
- AGRICULTURAL & RURAL SUPPORT SERVICES
- GOVT. STRATEGIES AND INTERVENTIONS
- REPLICATION OF EXPERIENCES

### II — POPULATION & EMPLOYMENT

- PRESENT POPULATION & CARRYING CAPACITY
- POPULATION DYNAMICS AND MIGRATION PROCESSES
- OFF-FARM INCOME & EMPLOYMENT OPPORTUNITIES
- REQUIRED INVESTMENT AND SUPPORT SERVICES
- GOVT. STRATEGIES AND DEVELOPMENT PROGRAMMES
- HUMAN RESOURCE DEVELOPMENT FOR O & M

### III — INFRASTRUCTURE & TECHNOLOGY

- REVIEW OF PRESENT INFRASTRUCTURE AND TECHNOLOGY
- TECHNICAL AND ECONOMIC POTENTIAL TO UPGRADE
  - TRANSPORTATION & COMMUNICATIONS
  - ENERGY SUPPLY, HEALTH & SANITATION EDUCATION
- POTENTIAL FOR UPGRADING AGRICULTURE THROUGH
  - IRRIGATION
  - MECHANISATION
  - POST-HARVEST TECHNOLOGY
- INSTITUTIONAL ARRANGEMENTS FOR IMPLEMENTATION

### IV — ENVIRONMENTAL MANAGEMENT

- REVIEW OF RESOURCE USE AND QUALITY
- ENVIRONMENTAL IMPACT ASSESSMENT
- DESIGN CRITERIA FOR SUSTAINABLE RESOURCE USE
- INTEGRATED WATERSHED MANAGEMENT
- CONSERVATION OF BIO-DIVERSITY
- POLICIES AND INSTITUTIONS FOR ENVIRONMENTAL MANAGEMENT

## KNOWLEDGE BANK AND DISSEMINATION SERVICES

LIBRARY ↕ PUBLICATIONS

COMPUTERS ↕ CARTOGRAPHY

## Dissemination and Action Programmes

### V — DOCUMENTATION & INFORMATION EXCHANGE

- DOCUMENTATION SERVICES & BIBLIOGRAPHIC DATABASES
- ABSTRACTING & INITIATION OF PRIORITY SUBJECT DATABASES
- USAGE OF INTERNATIONAL DATABASES INCLUDING AGRIS, INFOTERRA, ETC.
- EXPANSION OF HKH NETWORKING AND INFORMATION EXCHANGE
- INTENSIFY INFORMATION DISSEMINATION IN BOTH PRINTED AND AUDIO VISUAL FORMS

### VI — NATURAL RESOURCES ASSESSMENT & MONITORING

- NATURAL RESOURCE DATA BASES & MAPPING
- HAZARD MAPPING AND PROJECT IMPACT ASSESSMENT
- ENVIRONMENTAL MONITORING
- REMOTE SENSING AND GIS BUILT-UP
- TRAINING IN USE OF GIS AT DIFFERENT LEVELS
- DISSEMINATION EXCHANGE OF NATURAL RESOURCES DATA MANAGEMENT

### VII — AREA DEVELOPMENT PLANNING & IMPLEMENTATION

- STRATEGY INTERACTION WITH NATIONAL PLANNING BODIES
- ESTABLISHMENT OF BASELINE DATA & RESOURCE POTENTIAL
- MULTI-LEVEL COMPREHENSIVE & INTEGRATED PLANNING INCLUDING LOCAL PARTICIPATION AND CONSULTATION
- PRIORITISATION OF DEVELOPMENT ACTIVITIES
- INSTITUTIONAL ARRANGEMENTS FOR IMPLEMENTATAION

### VIII — INSTITUTIONAL & PROFESSIONAL DEVELOPMENT

- ASSESSMENT OF TRAINING NEEDS
- TRAINING MATERIALS AND COURSES
- SMALL RESEARCH AWARDS
- SENIOR RESEARCH FELLOWSHIPS
- EXCHANGE OF PROFESSIONAL STAFF
- ADVISORY ACTIVITIES AND CONSULTATIVE SERVICES
- HIGH-LEVEL SEMINARS AND SYMPOSIA

# Part I

# Thematic Research and Development Programmes

*As presented in the ICIMOD Workplan Framework, the four thematic research programmes are*

| | | |
|---|---|---|
| *Programme I* | : | *Mountain Farming Systems;* |
| *Programme II* | : | *Mountain Population and Employment;* |
| *Programme III* | : | *Mountain Infrastructure and Technology; and* |
| *Programme IV* | : | *Mountain Environmental Management.* |

*These programmes were established to cover priority issues pertaining to the problems of resource degradation, sustainable development, and poverty in the mountains. The integrated concept, along with mountain specificities and the inextricable link between development and conservation, was to be fully internalised by these programmes in the search for better options and for sustainable development in the mountains.*

*Each programme was charged with developing projects in identified priority areas. These projects were to be clearly defined with measurable objectives: specified time periods for implementation; resource requirements; and criteria for output assessment.*

*Knowledge reviews, case studies, seminars, and workshops were to be the main means for the transmission of knowledge and skills.*

# Mountain Farming Systems

## Rationale

**In mountain areas, agriculture is a dominant activity both in terms of sustaining the majority of th mountain people and serving as a major focal area to which resource degradation/ unsustainabilit issues and the remedial interventions directly relate.**

## Focus

*Farming in the Mountains (T. Partap)*

This programme deals with agriculture which is defined broadly to include all land-based, biomass-related activities, such as crop production, horticulture, forestry, pasture and animal husbandry, and their support systems.

Based on the state-of-the-art reviews, an assessment of the prevailing situation in mountain agriculture indicated the dominance of a number of measurable and verifiable negative changes. These changes relate to crop yields, availability of mountain products, productivity of the natural resource-base, and the economic condition of mountain people; ironically, over the last four to five decades, these negative changes have taken place despite increased resource allocation and development efforts in mountain areas. Hence, they can be termed *indicators o unsustainability*. A number of important characteristics o mountain environments were also defined and these, alon with the unsustainability indicators, became an important basis for research into mountain farming systems.

**MOUNTAIN CHARACTERISTICS/SPECIFICITIES**

**INACCESSIBILITY**

(Remoteness, distance, isolation, restricted external linkages, etc.)

**FRAGILITY**

(Vulnerability to irreversible damage, low carrying capacity, limited production options, high overhead cost of use, etc.)

**MARGINALITY**

(Cut off from mainstream, limited production option, high dependency, etc.)

**DIVERSITY**

(Complex of constraints and opportunities, interdependence of production bases and products/activities, etc.)

**'NICHE'**

(Small and numerous specific activities with comparative advantages; use of some beyond local capabilities, etc.)

**ADAPTATION MECHANISMS**

(Folk agronomy, ethno-engineering, collective security, diversification, self provisioning, etc.)

## Indicators of Unsustainability in Mountain Agriculture

| Types of Changes | Changes Related to | | |
|---|---|---|---|
| | **Resource Bases** | **Production Flows** | **Resource Use/ Management Practices** |
| **Directly visible changes** | • Increased landslides and other forms of land degradation<br>• Abandonment of terraces<br>• Reduction in per capita availability of cultivated land<br>• Increased fragmentation of land holdings<br>• Change in genetic composition of forest/pasture<br>• Reduction in water flows for irrigation, domestic use and *ghatta* (grinding mills) | • Negative trends in crop yields and livestock productivity<br>• Increased input requirements per unit of production.<br>• Increased time and distance in food, fodder, and fuel gathering<br>• Lower per capita availability of agricultural products | • Reduction in the intensity of crop rotation, intercropping, and diversified resource management practices<br>• Extension of cultivation to submarginal lands<br>• Replacement of social sanctions for resource use by legal measures |
| **Changes in reponse to resource degradation** | • Substitution of big animals with small animals such as cattle by sheep/goats<br>• Change from deep rooted crops to shallow rooted crops<br>• Shift in use of external inputs, from local manures to chemical fertilizers | • Increased seasonal migration<br>• Introduction of public distribution of food and inputs<br>• Intensive cash cropping on limited areas | • Unbalanced and high intensity of external input use<br>• Increased specialisation in mono cropping |
| **Potentially negative changes due to development interventions** | • Introduction of new production systems without linkages to other diversified activities<br>• Promoting excessive dependence on outside resources (e.g., fertilizer), subsidies<br>• Ignoring traditional adaptation experiences (traditional irrigation structure) | • Agricultural measures directed to short term rapid results<br>• Promoting product-centred rather than resource-centred approaches to development | • Ignoring mountain characteristics in designing programmes and policies for mountain area development<br>• Neglect of indigenous wisdom and skills, excessive dependence on external expertise. |

*With these indicators as parameters within the framework of defined mountain characteristics/specificities, the work of this programme is now directed towards a search for sustainability in mountain agriculture. The planned studies from 1988 to 1990 focus on public interventions and farmers' strategies to examine their sustainability implications in selected parts of the Region.*

Another related goal of the work was identification, assessment, and application of technological and institutional measures to arrest and reverse the above-mentioned negative trends and thereby enhance the sustainability of mountain agriculture. The research areas for sustainability elements included : (i) farmers' strategies and resource use practices, (ii) public policy and programme interventions, (iii) advances in the field of science and technology relevant to mountain areas, and (iv) replicable experiences of agricultural projects in mountain areas. The work approach included (i) knowledge reviews, (ii) field studies, and (iii) miscellaneous activities implying action-cum-training and advisory input in the relevant activities falling within the ICIMOD mandate. The geographical focus of the work covered selected hill areas of Bhutan, China, India, Nepal, and Pakistan. However, for reasons of logistics and priorities, all areas could not be covered with the same degree of intensity.

## 1984 to 1988: Laying the Foundations

State-of-the-art reviews were conducted of selected public interventions in mountain agriculture; several important topics related to policies and programmes were identified. These included overall approaches and strategies for agricultural development; the sectoral policies and programmes covering horticulture, foresty, livestock, and agricultural support services ranging from R and D or technology and extension to input supply systems and marketing.

The reviews were instrumental in helping us to arrive at a number of important conclusions.

1. Although writers were familiar with mountain problems, they did not reflect a conscious awareness of the mountain perspective as defined within the framework of mountain characteristics/specificities and unsustainability indicators.

2. The knowledge, understanding, and use of the mountain perspective in most cases were confined to a level where issues of resource characterisation and zonation are involved. A detailed account of mountain characteristics and their implications was presented in such exercises. However, beyond this, in matters concerning programme design, resource allocation, or project establishment, the decisions and actions were rarely influenced by mountain specificities and their interrelations.

3. A national concern for major problems such as poverty, unemployment, underemployment, resource degradation, and population pressure was expressed and some remedial measures also adopted, at least, in some parts of the mountain areas, but, in most cases, they were initiated as generalised interventions conceived without concern for mountain specificities and their interlinkages. *Because of lack of focus on the mountain perspective, most of the mountain conditions were treated as constraints.*

4. Public interventions were often addressed to the most visible (and manageable) mountain conditions. This applied to both (i) potentialities ('niche') and (ii) constraints. For instance, if mountains had potential for specific fruit crops they were emphasised. Similarly, if inaccessibility or isolation was a major manageable constraint, the attention (investment) was devoted to it. However, in most of these cases, the linkages of specific potentialities or constraints are rarely considered. Thus, even some of the programmes (due to their scale or common funding source) were called 'integrated projects', they were indifferent to the linkages

mountain characteristics which should be the natural basis of integration.

5. There are cases where, consciously or unconsciously, mountain specificities were considered for specific public interventions. For example, the horticulture-based, diversified development approach of Himachal Pradesh in India; the successful transformation of Miyi County in China, due to emphasis on activities with comparative advantages for the mountains; the fruit and vegetable-based intensive farming in a part of the Bagmati Zone in Nepal; and the mountain specificity-centred, integrated area development in parts of North Pakistan with AKRSP.

Subsequently, ICIMOD held a number of national workshops to produce a clearer assessment of the mountain perspective of public policies and programmes in order to understand their sustainability/unsustainability implications for mountain agriculture. The workshops also had some operational goals as listed below.

- *"To have a state-of-the-art picture of agricultural development policies and programmes in mountain areas and their varied perceptions held by diverse groups of professionals associated with them.*
- *To have comparative perspectives of agricultural development strategies in different countries of the HKH Region to facilitate the search for replicable experiences.*
- *To understand the individual country's problems and priorities relating to mountain agriculture and to guide ICIMOD's approach and priorities for collaborative work in different countries.*
- *To ensure interactions between the national experts and ICIMOD professionals to facilitate future exchanges and collaborations."*

Concomitant with these activities were field studies on farmers' strategies and the findings of these field studies were also discussed during the national workshops. The focus of the field studies was upon the following points.

i) How clearly do farmers understand mountain specificities and their implications ?

ii) How do farmers individually or collectively handle mountain specificities using technological and institutional means ?

iii) How have the traditional approaches been influenced by recent demographic, institutional, and technological changes, including public interventions ?

iv) What are the ways in which recent changes or transformation processes have affected farmers and how have the latter adapted to the changes?

v) What are the sustainability implications of (i) to (iv)?

Through both structured and open-ended, observation-oriented questionnaires, information was collected from sample farmers. Village level data, through both group interviews and the recording of oral history, were collected. The principal investigators of the field study teams were trained, especially in terms of the focus of the studies.

These studies were conducted in China, India, Nepal, and Pakistan and used a framework and methodology devised by ICIMOD. Some details of the field studies on farmers' strategies in selected mountain areas are listed on the following page.

In addition to this work on the sustainability issues, in February, 1987, ICIMOD, in collaboration with IDRC and the Ministry of Agriculture of His Majesty's Government, Nepal, had organised the *International Workshop on Mountain Agriculture and Crop Genetic Resources*. The purpose was to examine the special features of various mountain agricultural systems, their specially adopted crops, and the exchange of genetic resources among different areas so that crops well-adapted to one mountain area might be encouraged to grow in other regions with similar characteristics. The workshop was attended by forty-eight participants from 14 countries, including Ecuador, Peru, Ethiopia, Kenya, Thailand, and countries of

**DETAILS OF FIELD STUDIES ON FARMERS' STRATEGIES**

| Items | China | India | Nepal | Pakistan |
|---|---|---|---|---|
| Study Area | W. Sichuan | Himachal Pradesh | Bagmati and Gandaki zones | Chitral District (NWFP) |
| Collaborating Institution | Institute of Mountain Disaster and Environment (CAS), Chengdu | Economics Department, Himachal University, Shimla | APROSC, Kathmandu | AKRSP, Chitral |
| Sample No. of Households | 90 | 90 | 150 | 90 |

the HKH Region. The meeting stressed that ICIMOD should carry out the study and categorisation of mountain agro-ecological zones, so that the potential and impact of germplasm exchange upon mountain development could be enhanced through scientific identification of compatible source and target areas.

International cooperation in the exchange of crop genetic resources was envisaged in three stages. First, to start with, the collection/exchange of resources; developing contacts between agriculturists, geneticists, and crop scientists; and the exchange of knowledge/information about the biophysical setting for specific crops would be initiated. At the next stage, materials would be exchanged through visits between agricultural/genetic scientists of the Region. Th final stage would be an expedition by a team of scientis from one region to another to assess the potential for th large-scale exchange of crop genetic resources an germplasm.

Subsequently, a summary workshop report and a book o "Mountain Agriculture and Crop Genetic Resources" wa published by ICIMOD and IDRC respectively.

Thus, all of this work on mountain agriculture laid th foundations for ICIMOD's work on strategies fo sustainable mountain agriculture which had gaine significant momentum by 1989.

**WORKSHOPS AND PUBLICATIONS (1984-1988)**

*International Workshop on Agriculture and Crop Genetic Resources. Kathmandu, Nepal, February, 1987 - in collaboration with the Ministry of Agriculture, HMG/Nepal and the International Development Research Council (IDRC), Canada.*

*International Expert Meeting on Himalayan Fodder and Pasture. Kathmandu, Nepal, May, 1987.*

*Workshops on - Development Experiences in Mountain Farming Systems: Policies and Strategies.*

- *Manali, April, 1988 - in collaboration with the Himachal Pradesh University, India.*
- *Chengdu, October, 1988 - in collaboration with the Chinese Academy of Sciences, China.*
- *Kathmandu, November, 1988 - in collaboration with the Ministry of Agriculture, HMG/Nepal.*
- *Saidu Sharif (Swat Valley), February, 1989 - in collaboration with the University of Peshawar, Pakistan.*

Workshop Report
**Mountain Agriculture and Crop Genetic Resources**
International Workshop on Mountain Agriculture and Crop Genetic Resources. Kathmandu, Nepal, February, 1987.

Occasional Paper No. 7
**Forestry-Farming Linkages in the Mountains**
T.B.S. Mahat - March,1987.

## 1989

As stated in the foregoing reviews of work leading to 1989, the years up to and including 1988 laid the groundwork for a clearer concept of where ICIMOD was going. This is even more so in the case of Mountain Farming Systems. Our search for strategies in sustainable mountain agriculture continued with concentration upon the collection of *quantative and qualitative data* on agricultural diversity, degradation of soil and vegetation, crop yields, and livestock composition. We noted in particular the constraints on the application of traditional knowledge of resource conditions and methods for usage. Reasons for this appeared to lie in the *insufficiency of land for extensive agriculture; inability of traditional farming practices to meet increased family needs; and the emphasis on cash crops*. The cash nexus and increased population has led to a shift from traditional grain crops and a tendency to farm marginal lands.

West Sichuan (China) displayed some specific features. Traditional methods and practices in mountain farming were discontinued following the revolutionary institutional changes in China. Mountain areas in China were also subjected to the same generalised institutional changes (and to an extent technological changes), but, due to several factors, some of the traditional practices survived in the mountains. After the 1978 reforms, the rationale of traditional practices became important for farming systems. However, following the reforms, which encourage individualistic tendencies, some of the collective measures conducive to sustainability were disregarded. Maintenance of collective assets, e.g. watershed, drainage, and irrigation was ignored.

*A dual system of subsistence cum monetised economics exists side by side.*

## *Horticulture - Status and Prospects in the HKH Region*

Horticulture is a land-based activity well-suited to the mountains, and most of the countries in the HKH Region have placed considerable emphasis on horticultural development. However, the performance and experience vary significantly. To facilitate the exchange of experience and identify replicable approaches, an International Expert Meeting on Horticultural Development in the HKH Region was organised from 19 to 21 June, 1989.

*Apple Orchard in China (T. Partap)*

The specific objectives of the Horticultural Expert Meeting were:

- to facilitate systematic exchange of experiences in horticultural development in the Hindu Kush-Himalayan Region;
- to facilitate discussion on the linkages involved in production and processing technologies, marketing organisation and extension services, and the economic management of input supply and marketing systems;
- to assess the environmental issues of large-scale horticultural development in mountain areas; and

- to examine the role of mountain horticulture, within national strategies, as a component of sustainable farming systems.

The need for proper zonation, for diversification of the botanical base of horticultural development, and for the sensitisation of interventions to mountain perspectives were some of the important issues discussed. The salient points raised came under the following headings.

- Production and Productivity of Horticultural Crops;
- Diversification of Horticulture through Ancillary Horticultural Programmes;
- Marketing and Utilisation of Horticultural Produce;
- Horticultural Research Requirements; and
- Conclusions and Recommendations.

A summary report of the meeting has already been published.

## *Underexploited Genetic Resources*

State-of-the-art reviews on underexploited plant genetic resources were initiated in Bhutan, China, India, Nepal, and Pakistan. The country reports, based on reviews of the literature as well as limited supplementary exploration, have been prepared. The synthesis of these country reports in the overall context of the HKH Region is in progress.

The reviews indicate the significant role of and potential for these resources in sustaining farming systems in the remote areas. Many of these resources (e.g. medicinal plants) constitute 'niche' or products having comparative advantages for the mountains. With increased penetration of markets, their role has increased.

Substantial work is in progress on a shrub called seabuckthorn. This is a specific plant found in relatively marginal, fragile mountain areas where precipitation is low (e.g. Trans-Himalayan Region). The fruit of this plant has a high content of Vitamin C and of bio-active substances and can be used for soft drinks, medicines, and cosmetics. While China has a large programme for its development and processing, other countries usually consider it to be a useless bush. Based on Chinese experience, prospects for this pla are being explored and analysed.

*Seabuckthorn (Lu Rongse*

## *Apiculture and Sustainable Mountain Agricultur*

Apiculture is becoming increasingly important for mountai farming systems and offers specific advantages fo developing sustainable agriculture. It is exclusively non-land based income and food-generating activity whic does not compete for resources within a farm. It has positiv ecological consequences. Moreover, it promote productivity levels of several mountain fruits, vegetables, o seeds, and fodder crops through cross-pollination. A International Expert Meeting on Apicultural Developme in the HKH Region was organised from 21 to 23 June, 198 The major recommendations of the meeting emphasised number of points.

- The need for establishing an International Researc and Training Centre for Apicultural Developmen for which HMG-Nepal agreed, in principle, to b the host country.
- The need to make beekeeping an integral part o crop and horticultural management technology.
- The need to enact legislation to minimise bee losse caused by the harmful effects of biocides and t conserve native bee genetic and floral resources.
- The need to prepare training manuals in beekeepin for trainers and farmers in the Region.

A report of the meeting has been published already.

he other important activities nder apicultural work included e following items.

- A Feasibility Report on Apiculture in Bhutan and
- "Beekeeping for Mountain Crop Productivity"

hese formed the basis of an MOU etween ICIMOD and the AO/HMG Nepal, Vegetable eed Production Project. The urpose is to demonstrate the potential for vegetable seed production through bee pollination. The programme is carried out in three ecological zones. ICIMOD input is confined to technical advice and the training of farmers and supervisors. The activity has received enthusiastic response from farmers.

*Apiculture and Cropping (L.R. Verma)*

## WORKSHOPS AND PUBLICATIONS (1989)

*International Expert Meeting on Horticultural Development in the Hindu Kush-Himalayan Region, Kathmandu, Nepal,. June, 1989 - in collaboration with the Ministry of Agriculture, HMG/Nepal, and FAO.*

*International Expert Meeting on Apicultural Development in the Hindu Kush-Himalayan Region, Kathmandu, Nepal,. June, 1989 - in collaboration with the Ministry of Agriculture, HMG/Nepal, and FAO.*

Workshop Report

**Apicultural Development in the Hindu Kush-Himalayas**
International Expert Meeting on Apicultural Development in the Hindu Kush-Himalayan Region, Kathmandu, Nepal, June, 1989.

Workshop Report

**Horticultural Development in the Hindu Kush-Himalayas**
International Expert Meeting on Horticultural Development in the Hindu Kush-Himalayan Region, Kathmandu, Nepal, June, 1989.

## The Future Perspectives

The future work plans of the MFS Programme involve the conclusion of the first phase activities in the form of the presentation of results in formal papers. These inputs led to the preparation for an International Symposium on Strategies for Sustainable Mountain Agriculture to be held in September, 1990. The major goal of the symposium is to share the insights, understanding, and results of past work with others involved with mountain agriculture.

Secondly comes the follow-up on the results and issues generated by past work. This constitutes the Second Phase of work on Sustainable Mountain Agriculture. Under this phase, the work will be divided into four interrelated components.

### *Four Components*

1. Linkages with mainstream work on sustainability will be initiated on a larger scale. Focus on unsustainable crisis areas involves the application of the framework and concepts evolved during the first phase, in order to understand the dynamics of unsustainability by concentrating on selecte locations where crisis situations have emerged.

2. An inventory of indicators of unsustainability whi implies further refinement of the concepts a methodologies for the quantification of indicato of unsustainability and their verification extensive areas; including the assessment of co and benefits associated with alternative courses action.

3. The identification and assessment of sustainabili options needs testing along with the furth development of first order potential options f sustainability which have emerged from previo work. In this respect, greater emphasis on acti research will be needed.

4. The development and use of the linkages ICIMOD, with the work on sustainability and operational implications elsewhere, will not on help make sustainability an integral part development concerns and designs but w demonstrate the replicability of ICIMOD concep and methodologies.

# Mountain Population and Employment

## Rationale

**Continued population growth in mountain areas has increased the pressure on land and other resources and is contributing to accelerated deterioration of mountain environments and the increasing impoverishment of the mountain people. The traditional subsistence production regime has been unable to cope with these problems and even its upgrading to a sustainable commercial farming system will not provide sufficient income and employment to many of the mountain communities. A major area of focus in integrated mountain development should therefore be the promotion of off-farm employment and income-generating opportunities.**

## Focus

Factors and processes that are examined and assessed in the context of promoting sustainable off-farm employment and income-generating opportunities in the mountain areas include the dynamics of the present population and the carrying capacity of resources, both existing and potential; operative demographic processes, such as migration and urbanisation; government strategies and interventions for the promotion of off-farm income and employment-generating opportunities; organisation and management for human resource development; provision of support services, including technology and extension; effective investment and implementation approaches, both existing and potential; and replication of successful experiences. Knowledge reviews, case studies, seminars, and workshops are the means through which assessments are conducted.

*Population Pressure (Population Dept., NPC)*

## 1984 to 1988: Laying the Foundations

### *Institutional Dimensions of Mountain Development*

A major programme on Mountain Institutional Development was initiated in 1987. The programme focussed primarily on organisational resources and their relationship to the management of natural resources. The programme was designed to investigate the potential of existing local institutions to facilitate implementation and enhance local participation in rural development programmes. The impetus for the development of this programme came from two earlier activities. The International Workshop on Watershed Management in the Hindu Kush-Himalayan Region in 1985 highlighted the need for effective rural institutions to manage mountain resources. As a follow-up, ICIMOD organised a workshop in Pakistan in collaboration with the East-West Centre and the Aga Khan Rural Support Programme (AKRSP) on "Institutional Development for Local Management of Rural Resources". The major focus of discussion was on the definition and management of common property regimes.

ICIMOD, in collaboration with professionals from various national institutions, has completed six case studies in selected mountain locations in China, Nepal, and Pakistan. The studies include projects being implemented by government agencies as well as by non-governmental organisations. The field sites were carefully selected to cover these projects that seek to implement particularly innovative institutional strategies. The studies have also examined prevalent indigenous resource management systems, in the project areas, to explore the possibilities of building on these organisational structures. The case studies carefully analysed and assessed:

*Women at Work (T. Part*

- development strategies and approaches adopted by implementing agencies;
- operational management systems for various types of common property regimes in different countries;
- mediating structures that have evolved through interaction of mountain communities with development processes; and
- the utility and effectiveness of alternative organisational structures for sustainable resource management.

It is scheduled to publish the results of these case studies in the Discussion Paper Series of the Mountain Population and Employment Division early in 1990.

## *Women's Role in Mountain Development*

Though the invisibility of women's work and contributions have been widely recognised through empirical findings, the methods and strategies to integrate them in program design, planning, and implementation are, however, no readily forthcoming. Furthermore, conceptual difficul arise in understanding the specifics of problems that per in mountain communities and which marginalise wom depriving them of the benefits of development. Whilst need to incorporate "gender specific" perspectives into planning process has become a policy rhetoric, effort translate this at an operational level have been less t satisfactory.

The need for a better understanding of these pract approaches that emphasise gender perspectives and t effectiveness in improving mountain resource managem have therefore been given direct emphasis by the Centre 1988, the Centre's efforts in this direction material through a request to Ford Foundation for support to programme *on the Role of Women in Mount Development*. The most significant activity of this sup was the organisation of a workshop on Wom Development, and Mountain Resources: Approache Internalising Gender Perspectives. This brought togeth number of relevant institutions and agencies in the men countries of the Hindu Kush-Himalayas in a collabora attempt to design and implement specific field studie

*The need for gender perspectives in mountain development is now an accepted reality. Women for the linchpins of the mountain economy and contribute to basic sustenance of the subsistence household, under extreme conditions of hardship which are exacerbated by the gradual deteriorati of the natural resource-base.*

women's role in hill farming systems, within the holistic framework of development and environmental management. Emphasis was placed on generating discussions amongst participants who included professionals from various divisions of ICIMOD as well as invited professionals from Bangladesh, China, West Germany, India, Nepal, and the United States of America.

The workshop was held in November, 1988. Presentations included conceptual papers as well as case studies from China, India, and Nepal, with particular focus on four themes.

- Issues concerning women and development and their relevance in the mountain context.
- Women and mountain farming systems.
- Energy, employment, and women in the mountains.
- Women, environment, and mountain development.

The case studies presented were as follows.

- Rural Women's Roles and Status in the Development of Mountainous Areas: A Survey of Women in Miyi County, Sichuan Province.
- Social Ecology of Women's Roles in the Hills of North East India.
- Commercial Agriculture and the Changing Context of Women's Work and Status: A Case Study from Tehri Garhwal, U.P., India.
- Women as Environmental Managers in Nepal: A Study of Kakani Village Panchayat, Nepal.

The concept papers include the following.

- Women and Development: Conceptual Issues from a Global Perspective.
- Women in Mountain Resource Management in Nepal.
- Conceptual Perspectives on Women's Role in Mountain Resource Management.
- Reaching Out to Forest Users: Strategies for Involving Women.
- Energy, Employment, and Women in Mountain Areas.
- Women's Participation in Off-farm Employment and Possible Options in Nepal.

The workshop report has been published. The case studies and concept papers will be published as part of the ICIMOD Discussion Paper Series under the Population and Employment Programme. These publications cover significant issues and recommendations that provide further insight into the need for sustaining ICIMOD's efforts to give due attention to a gender perspective in programme development.

Another equally significant outcome of this exercise was the strengthening of the Centre's resource-base in the form of documentation and information exchange across national frontiers. The efforts of relevant organisations such as the Centre for Women and Development and the Centre for Economic Development and Administration, Kathmandu, Nepal; the Research Foundation for Science, Technology and Natural Resource Policy, Dehra Dun, India; and the Chinese Academy of Sciences, Beijing, China; culminated in the annotation of available literature on Women and Mountain Development. The Bibliography, to be published in 1990, covers a wide range of subjects under the main topic and was designed according to standards set by the CDS-ISIS software system which is presently being used in the ICIMOD library. This will facilitate easy access and reference for an information network in which women and mountain development will be a major subject area.

The institutional dimensions and gender perspectives in relation to mountain development, pursued until now within this Division, will eventually be subsumed under each of the thematic research and development programmes. Work related to decentralised energy planning and management which was initiated in this Division is now pursued further within the Mountain Infrastructure and Technology Division.

**WORKSHOPS AND PUBLICATIONS (1984-1988)**

*International Workshop on Planned Urbanization and Rural Linkages in the Hindu Kush-Himalaya Region, Kathmandu, Nepal, March 1986 - in collaboration with the Department of Housing, Building, and Physical Planning, Ministry of Works and Transport, HMG/Nepal; Nepal National Committee for Man and Biosphere of UNESCO; and UNESCO (MAB Programme), Paris.*

*International Workshop on Institutional Development for Local Management of Rural Resources, Gilgit, Pakistan, April, 1986 - in collaboration with East-West Centre, Hawaii and Aga Khan Rural Support Programme, Pakistan.*

*International Workshop on Off-farm Employment Generation in the Hindu Kush-Himalaya, Dehra Dun, India, May, 1986 - in collaboration with the Ministry of Environment, Forest and Wildlife, Government of India; and Forest Research Institute, Dehradun, India.*

Workshop Report
**Towns in the Mountains**
International Workshop on Planned Urbanization and Rural-Urban Linkages in the Hindu Kush-Himalaya, Kathmandu, Nepal, March, 1986.

Workshop Report
**People and Jobs in the Mountains**
International Workshop on Off-farm Employment Generation, Dehra Dun, India, May, 1986.

Workshop Report
**Women in Mountain Development**
International Workshop on Women, Development, and Mountain Resources: Approaches to Internalising Gender Perspectives, Kathmandu, Nepal, November, 1988.

## 1989

In 1989, two new projects were developed.

### 1. *Assessment of Critical Issues and Options in Mountain Off-farm Employment*

The general objective of this programme is to (i) assess the critical issues and options in mountain off-farm employment and (ii) search for guidelines towards more effective policy interventions and programme implementation.

ICIMOD has developed an analytical framework based on the state-of-the-art reviews done during 1984-86 and conclusions reached at a workshop on Off-farm Employment held in 1986. It provides a systematic basis for the review of (a) broader implications of off-farm employment for environmental, demographic, economic, and distributional concerns in the mountains and (b) operational problems and prospects of specific activities in particular areas. In conducting the analysis, attention is given to special characteristics that prevail in the mounta viz, inaccessibility, fragility, marginality, and divers Emphasis is placed on unique opportunities for harnes comparative advantages vis-a-vis indigenous knowle systems and specific resource-related features. The analy will be undertaken in China, Nepal, and Pakistan. review of prominent or potential off-farm activities wil followed by an in-depth analysis of one or two such activi in each country. This proposal was submitted to IDR 1989 and is expected to be approved in May 1990.

### 2. *Employment Promotion and Environment Regeneration through Rural Women's Organisation*

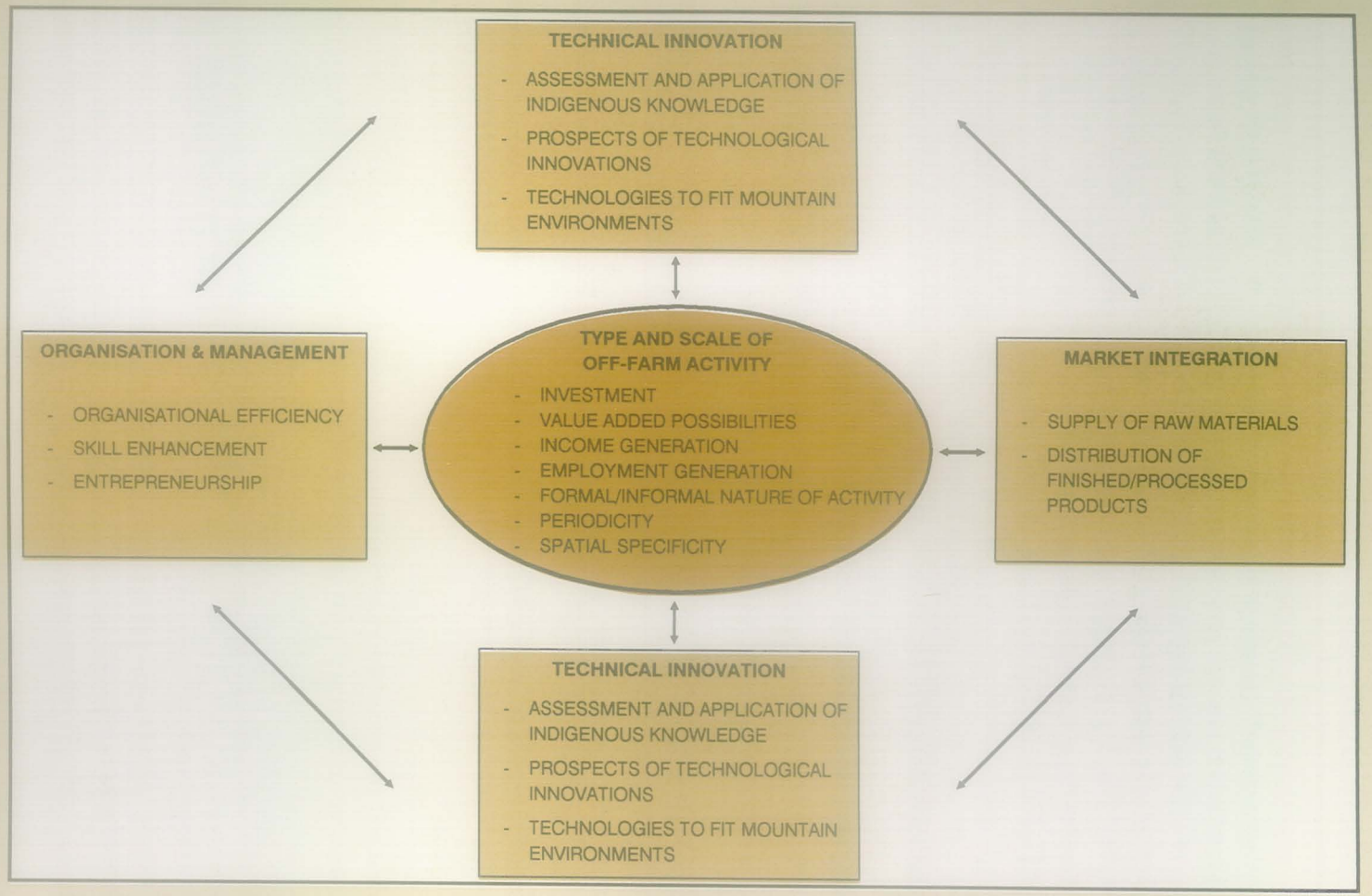
*Displacement and destruction of their surviva resource-base have forced large segments of the population into a vicious spiral of poverty and survival crises.*

## Schematic Framework for the Analysis of Critical Issues and Options in Off-farm Employment

### A. The Broader Context

- ENVIRONMENT AND RESOURCES IMPLICATIONS FOR MOUNTAIN AREAS
- IMPLICATIONS FOR POPULATION AND SPATIAL PROCESSES
- LINKAGES WITH THE FARMING SYSTEM AND INFRASTRUCTURE
- IMPLICATIONS FOR EMPLOYMENT GENERATION
- GENDER PERSPECTIVES AND IMPLICATIONS FOR THE POOR AND MARGINALISED

### B. The Context of Specific Off-farm Activity



A proposal was prepared jointly by ILO and ICIMOD to undertake an action-research programme to address the problems of environmental degradation and the survival of poor rural households with long-term strategies and solutions. In recent years, there has been a growing awareness of the magnitude of environmental degradation and its impact on the livelihood of the people in developing countries. In Asia, an acute crisis has made itself felt in terms of drastic losses of arable land, water resources, and increasing deforestation leading to soil erosion, siltation of rivers, droughts, and floods. All these have resulted in the growing pauperisation of large sections of the rural population.

In this situation, the women of such households are under increasing pressure to meet the subsistence needs of their households. Through the loss of forest cover, and their time-honoured rights of access to forest land, poor women in rural areas face great difficulties in provisioning their households with food, fodder, fuel, medicine, and shelter. They have also lost out under the modern legal systems and development processes; whereas male rights, and centralised male-dominated decision-making processes, have been promoted. As a result of the continuing depletion of the natural resource-base, and the dispossession of women from traditional rights of use and participation, they suffer increased drudgery in meeting basic needs. It is essential, therefore, to involve rural women in the rehabilitation of the environment and, at the same time, provide alternative sources of income.

*The objectives of this project are:*

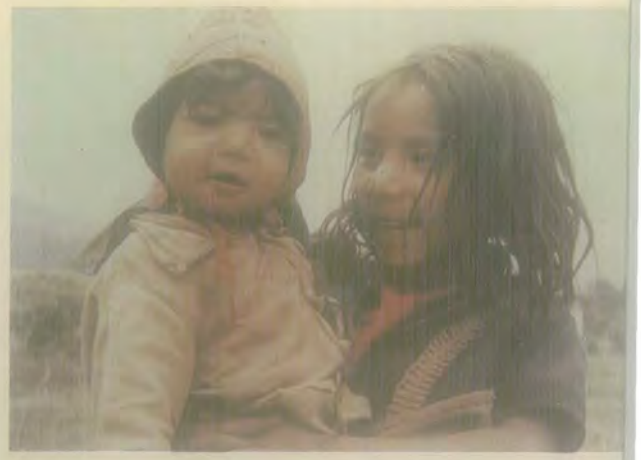
- to provide viable economic alternatives to poor rural women;
- to plan with them to meet their food, fodder, and fuel needs without environmental destruction;
- to provide them with access to training, technolo and decision-making for environmental regene tion; and
- to engage in pilot demonstrations to bring the priorities and experiences into mainstream planni and programmes.

All the activities will be implemented in close collaborati with professionals and institutions in the Region. T project is currently submitted to UNDP which has sho keen interest in it.

## The Future Perspective

### *1. Population and Carrying Capacity*

"Carrying Capacity" is a theme that cuts across ICIMO Thematic Research and Development Programmes as w as the Area Development and Planning Programe. Ther a need for the development of a methodological framew that allows a dynamic conceptualisation of the notion "carrying capacity". Area-specific case studies will have be conducted in conjunction with the methodology.



*Population Carrying Capacity! (M.T.Sh*

**PUBLICATION (1989)**

Occasional Paper No. 10.
**Hill Agriculture and the Wider Marketing Economy: Transformation Processes and Experience of the Bagmati Zone in Nepal**
Mahesh Banskota - May 1989.

## 2. *Migration and Employment*

Programmes up to now have touched upon, but not adequately dealt with, some of the important issues concerning migration and employment. The focus needs to be on issues such as the implication of types of migration for different categories of employment generation in the mountains. Area-specific case studies and analyses based on secondary sources of information have to complement the study. Migration and employment is a priority area for assessment in the context of regional/district/local level planning and employment creation.

## 3. *Role of Market Towns in Employment Generation*

Recent literature places a lot of emphasis on the linkages between the development of market towns, commercialisation of agriculture, and the growth of non-farm employment opportunities. This linkage in mountain areas is thought to be tenuous because of the lack of a functional hierarchy of settlements. Strategies for market town development should form an essential part of the strategy for promoting off-farm employment in the mountains.

### INSTITUTIONAL COLLABORATION

**Organisation and Management of Rural Development**

| | | |
|---|---|---|
| China | : | Institute of Mountain Disasters and Environment, Chengdu.<br>Commission for Integrated Survey of Natural Resources, Beijing.<br>Institute of Geography, Beijing.<br>Institute of Rural Development, Beijing. |
| Nepal | : | Nepal-Australia Forestry Project.<br>Dhading District Development Project. |
| Pakistan | : | Aga Khan Rural Support Programme, Gilgit.<br>Pak-German Self-Help Project, Quetta. |

**Role of Women in Mountain Development**

| | | |
|---|---|---|
| China | : | Institute of Rural Development, Beijing.<br>Institute of Geography, Beijing. |
| India | : | Research Foundation for Science and Technology and Natural Resources, Dehra Dun. |
| Nepal | : | Centre for Women and Development, Kathmandu.<br>Centre for Economic Development and Administration, Kathmandu. |

**Off-Farm Employment in the Mountains (Forthcoming)**

| | | |
|---|---|---|
| China | : | Institute of Mountain Disasters and Environment, Chengdu.<br>Institute of Rural Development, Beijing. |
| Nepal | : | Agricultural Projects Services Centre, Kathmandu. |
| Pakistan | : | Centre for Applied Economic Studies, Peshawar. |

# Mountain Infrastructure and Technology

## Rationale

**Inaccessibility in mountain regions is a formidable constraint to development. The building all-weather roads through the mountains for improved access to remote areas is exceptionally cos and technically complicated, particularly on steep and unstable slopes. Similarly, large constructi projects such as dams, reservoirs, and irrigation canals also face similar problems. Another criti area of concern in the mountains is the acute shortage of energy. It is commonly known that fuelwood demand is a major contributing factor in deforestation in these areas. This severity energy problems has made it necessary to accord high priority to rural energy in all countries of Region. It is ironic that the Region, endowed with one of the largest hydro-power potentials in world, should face an energy shortage. Thus, the search for alternative options to meet energy nee is of paramount importance. Similarly, appropriate technology, which can reduce the drudgery work for people in these areas and increase their productivity and income, needs to be identifi and promoted.**

## Focus

The Mountain Infrastructure and Technology Programme addresses itself to three priority areas; namely (i) Mountain Risk Engineering, (ii) Energy for the Mountains, and (iii) Appropriate Technology for the Mountains.

*Transportation in the Dry Arid Mountain Areas (T. Par*

Infrastructural development in the Hindu Kush-Himalayan Region is a formidable task with considerable problems, due to washouts and failures resulting from landslides, erosion, and gullying. Such problems are, to a significant extent, triggered by practices that are initiated during the planning and designing of mountain infrastructure and which have ramifications on their construction and maintenance. They are also compounded by deforestation and mass movements due to natural processes as well as human interference. The environmental and economic consequences of these problems constitute a big challenge in the building and maintenance of physical infrastructure. While the haza that cause the losses are either accelerated, decelerated, unaffected by the implementation of infrastructure, th has been no deliberate geological study to dev engineering methods or actions to modify the likelihood such hazards, or to reduce losses through risk aversion *major area of focus in the mountains, therefore, is*

*levelopment of guidelines for the construction of nfrastructure that is ecologically stable and conomically viable.* More needs to be learned about mproved techniques, better alignment, and greater use of ocally available construction materials in building and naintaining such infrastructure.

*The instability of mountain slopes is a natural tendency in the evolutionary course of mass wasting processes.*

## 1984 to 1988: Laying the Foundations

### *Rural Energy Programme*

From the beginning of its activities in September 1984, ICIMOD concentrated on the key issue of *Rural Energy in the Mountains*. In all consultations in the countries of the Region (and indeed at the ICIMOD Inaugural Symposium), the subject of the energy needs of mountain farming communities and of small urban centres in the mountains has been a high priority. The work in Rural Energy began with the state-of-the-art reviews in five countries. As part of this exercise, a meeting on Rural Energy in the Indian Himalayas took place at ICIMOD in January 1986 to review twenty Indian papers. The Tata Energy Research Institute (TERI), New Delhi, coordinated this effort in India under the guidance of a Steering Committee. Subsequently a book entitled "Rural Energy Planning for the Indian Himalaya", edited by T.M. Vinod Kumar (ICIMOD) and Dilip R. Ahuja (TERI), was published in 1987.

Two years of work on the state-of-the-art reviews on rural energy in five countries of the ICIMOD Region culminated in an International Workshop on District Energy Planning and Management for Integrated Mountain Development in Kathmandu in May 1986. Participants came from Bangladesh, China, India, Nepal, Pakistan, and Bhutan. A summary workshop report entitled "Energy for Mountain Districts" was published, followed by an Occasional Paper, "Decentralized Energy Planning and Management for the Hindu Kush-Himalaya," by Dr. Deepak Bajracharya.

As a follow-up to the workshop, a 23 month project on Strengthening Rural Energy Planning and Management in the HKH was initiated in January 1987, with financial support from the European Economic Community (EEC). The purpose of the project was to develop methods of rural energy planning and management in the mountain regions; to disseminate them among district level officials; and to train trainers from selected institutions in Bhutan, China, India, Nepal, and Pakistan.

In order to make the Training Guidelines and the Trainer's Manual on energy programme development meaningful in the context of the Hindu Kush-Himalayas, the following orientations were emphasised:

- focus on the special problems of mountain areas, and
- identification of the emerging roles of district level institutions for energy development in the context of the district planning and management organisations.

The orientation resulted in:

- addition of new topics to the guidelines; in order to incorporate the mountain dimensions and the operational mechanisms of district planning and management institutions; and
- adoption of a problem-solving approach by using case studies that demonstrated the needs of district level institutions as a training methodology.

Energy planning methods were studied and refined by examining a Manual for Training in Rural Energy Planning and Management which was prepared by the Twente University of Technology, the Netherlands. A review of existing literature was also carried out. A regional workshop and six case studies of rural energy issues in typical districts in the HKH countries were also organised. A second regional workshop discussed the training manual draft and finalised it. The final version was then used to conduct six pilot training programmes in China, Nepal, India (2), Bhutan, and Pakistan.

**Activities under the programme were:**

1. Adaptation and Improvement of the Manual for Training on Rural Energy Planning and Management prepared by Twente Univer (January to April, 1987).
2. The First Regional Consultation and Workshop on Strengthening Rural Energy Planning and Management in the Mountain Distri of the HKH (April, 1987).
3. Six district field case studies (June to December, 1987).
4. The Second Regional Workshop on District Energy Planning and Management (January, 1988).
5. Production of a book on 'Energy for Mountain Districts: A Training Guideline for Energy Programme Development' (April, 1988).
6. Production of Trainer's Manual (May, 1988).
7. Production of 'Instructions for Trainees' (May, 1988).
8. Conducting Pilot Training Seminars in China, Bhutan, India, Nepal, and Pakistan (May to October, 1988).

## *ICIMOD Energy Network*

ICIMOD collaborated with twelve national institutions in Bhutan, China, India, Nepal, and Pakistan. These institutions represented a wide variety of interests that included district administration, energy research and planning, natural resource surveys, regional development planning, environmental planning and management, agricultural credit and training, and research on decentralised planning and management. The network that has been established holds great promise for fu collaborations on ICIMOD's work on integrated moun development.

Finally, in January 1988, this Programme Division beg 26 month project on "Integrated Training for Mountain Engineering (MRE) in the Himalayas", with finar support from the European Economic Community (E An expert meeting was convened to assess and programme activities in October 1988 and a Draft Trai Manual was produced in December.

### WORKSHOPS AND PUBLICATIONS (1984-1988)

*Meeting on Rural Energy in the Indian Himalayas, Kathmandu, Nepal, January, 1986 - in collaboration with the Tata Energy Institute, New Delhi, India.*

*International Workshop on District Energy Planning and Management for Integrated Mountain Development, Kathmandu, Nepal, May, 1986 - in collaboration with the Ministry of Agriculture, HMG/Nepal, and the International Development Research Centre (IDRC), Canada.*

*Workshop on District Energy Planning and Management Methodology, Kathmandu, Nepal, October, 1987 - in collaboration with the European Economic Community, Belgium.*

*Pilot Training Programmes in District Energy Planning and Management.*

- *Chengdu, May, 1988 - in collaboration with the Chinese Academy of Sciences, Chengdu.*
- *Thimphu, June, 1988 - in collaboration with the Department of Power, Royal Government of Bhutan.*
- *Almora, July, 1988 - in collaboration with the Tata Energy Research Institute, India.*
- *Kathmandu, July, 1988 - in collaboration with the Agricultural Projects Services' Centre, Nepal.*
- *Simla, August, 1988 - in collaboration with the School of Planning and Architecture, India.*
- *Peshawar, October, 1988 - in collaboration with the Pakistan Academy for Rural Development, Pakistan.*

*International Expert Meeting on Mountain Risk Engineering in the Mountains, Kathmandu, October, 1988- in collaboration with the European Economic Community, Belgium.*

Occasional Paper No. 4. **Decentralized Energy Planning and Management for the Hindu Kush-Himalaya** - Deepak Bajracharya - September, 1986.

Occasional Paper No. 8. **Road Construction in the Nepal Himalaya, the Experience from the Lamosangu-Jiri Project** - Urs Schaffner - March, 1987.

Workshop Report

**Energy for Mountain Districts.** International Workshop on District Energy Planning and Management for Integrated Mountain Development, Kathmandu, Nepal - May, 1986.

**Institutional Collaboration in Rural Energy Planning and Management in the HKH Region**

| Countries | Collaborating Institutions | Case Studies (Districts) | No. of Trainees in Pilot Training Workshop |
|---|---|---|---|
| Bhutan | Thimphu District Administration, Department of Forests, Department of Power, and the Division of Science and Technology of the Planning Commission | Thimphu | 20 |
| China | Energy Research Commission, CAS<br>Energy Research Institute, CAS<br>Commission for the Integrated Survey of Natural Resources (CISNAR) | Ningnan County | 30 |
| India | Tata Energy Research Institute<br>Delhi School of Planning and Architecture | (i) Almora<br>(ii) Kulu | 39<br>14 |
| Nepal | Agricultural Projects Services' Centre<br>Agricultural Development Bank | Dhading | 20 |
| Pakistan | UNESCO/MAB Programme of Pakistan | Swat | 11 (in Training Workshop)<br>29 (in Energy Seminar) |

## 1989

### *Mountain Risk Engineering*

**MRE may be defined as an approach to infrastructural development that is based on interdisciplinary techniques for transforming the constraints of mountain hazards into tolerable risks and cost effective designs.**

The Mountain Risk Engineering Programme was initiated in order to identify training needs; design and conduct pilot training; and prepare a manual to provide reference materials for future training and practical application, for infrastructure in general and roads in particular, in mountain areas (e.g. the middle hills of Nepal).

*A Demonstration of Bioengineering Techniques for Slope Stabilisation (T. Partap)*

The MRE programme, though based in Nepal and focussed on hill roads, is an important step towards promotion of specific training and practices for environmentally suitable and cost effective infrastructure in the hilly areas of developing countries.

The 26 month programme (January, 1988 to February, 1990), with funding from the European Economic Community, has focussed on the following:

- design of a training curriculum for MRE,
- preparation of a 2 volume manual, containing background material, and an application guide for mountain infrastructure, focussed on roads, and
- awareness building concerning MRE approaches by making institutional provisions in the infrastructural agencies of the HKH countries.

The comprehensive objectives of the programme are to promote hill-oriented engineering training in academic institutions; to establish engineering-geological units in infrastructural agencies; to conduct in-service training; and to improve and publish the MRE manual, with a view to wider dissemination, in order to propagate its approaches towards infrastructural development; giving due consideration to both environmental and financial aspects.

The multidisciplinary approach, as contained in the Mountain Risk Engineering Programme, has focussed on two important issues; i.e. how best to reduce the impact of roads on environmental degradation and how to be cost effective. In connection with these issues a nine week pilot training programme for 20 engineers and geologists from China, Nepal, Bhutan, and Pakistan was held during February-April 1989. The Manual on Mountain Risk Engineering is very useful, rigorous in methodology, particularly addresses road construction in the mount The manual has been tested through pilot trai programmes in ICIMOD and will be published in book during the follow-up phase of this programme. Meanw an MRE Manual (primarily for linear infrastructure) produced in December 1989.

## The Future Perspective

An International Consultative Meeting on Mountain Engineering will be held in February 1990. It is envis that the meeting will assess the MRE approach and the v of the MRE Manual. The manual will provide prac lessons on the construction of infrastructure, ta geological as well as bio-engineering aspects consideration, and thus add an important milestone in construction of stable and environmentally so infrastructure. Depending upon the findings of this mee the subsequent task of the Centre, then, will be to dev and disseminate the MRE approach throughout the H Region.

In the context of mini and micro-hydel projects, ICIM has contracted the Intermediate Technology Developn Group (ITDG), England, to review the potential of mini micro-hydropower in Nepal. On the basis of this rev further work in this area will be initiated

A programme on Appropriate Technology for Moun Areas will be introduced in 1990. This will focus u activities such as the promotion of smokeless sto drinking water supply schemes, distance learning, promotion of hydrams and water turbines, and improvement of post-harvest technology.

### WORKSHOPS AND PUBLICATIONS (1989)

*Pilot Training Programme on Mountain Risk Engineering, Kathmandu, Nepal, February, 1989-April, 1989 - in collaboration with the European Economic Community, Belgium.*

# Mountain Environmental Management

## Rationale

**Development interventions over the last few decades have brought about tremendous changes in the mountains, often at the cost of the highly vulnerable mountain ecosystems. With rapidly growing populations, such development efforts have also exerted increased pressure on natural resources and have often caused degradation and irreversible damage to the environment. As development activities are to continue, and even need to be accelerated for rapid economic development, mountain environments and societies will be subjected to further accelerated transformations in the coming decades. This means there is an urgent need to look for alternative strategies and approaches for better and more efficient management in order to ensure sustainable development.**

## Focus

ICIMOD's programme on environmental management endeavours to respond to these challenges for the ecologically sustainable development of mountain areas with particular reference to the Hindu Kush-Himalayan (HKH) Region. The mobilisation of available knowledge on various aspects of the mountain environment and its dissemination through publications have been areas of major concern for this programme. Four major workshops/symposia have been held and numerous publications and papers have been produced.

*Degraded Ecosystems (M.T. Shah)*

## 1984 to 1988: Laying the Foundations

### *Integrated Watershed Management*

Earlier efforts at ICIMOD in this field began with a state-of-the-art review in the field of watershed management in 1984. This exercise was carried out in five countries of the ICIMOD Region, culminating in an International Workshop on Watershed Management in the Hindu Kush-Himalayan Region, organised by ICIMOD in collaboration with CISNAR, the Chinese Academy of Sciences (CAS), at Chengdu in October 1985. Sixty participants from China, India, Nepal, Pakistan, and bilateral and multilateral agencies attended the workshop. The workshop emphasised the absolute necessity of an integrated approach to watershed managment. It was generally agreed that the continuing development of the practical operational methodology for integrated watershed management was an urgent need to which ICIMOD could make a meaningful contribution.

A number of issues was identified as being of critical importance to more effective watershed management throughout the mountains:

- the need for a thorough examination of practical measures for mountain pasture managment with regard to the control of grazing, improved fodder production, and improved animal husbandry methods;
- the need for more effective watershed management institutions, with emphasis on positive incentives rather than negative controls; more concern with open consultation and popular participation; and, in particular, better ways of achieving constructive common property resource management;
- the need to include appropriate technology alternatives (particularly in energy, transport, and packaging of agricultural produce) as essential ingredients of integrated watershed management plans; and
- the need for a fuller understanding of the consequences of continuing population growth on watershed management in mountain districts and for urgent policy and programme action - particularly the provision of employment opportunities off the land - to relieve increasing population pressure on vulnerable mountain habitats.

A summary workshop report "Managing Mountain Watersheds" was published. Another publication from the workshop was *Collected Papers on Watershed Management in China*, published jointly by CISNAR and ICIMOD.

Another important activity under this programme was the organization of the *International Expert Meeting in Model Curricula and Training for Soil Erosion Control and Watershed Management in Mountain Areas* in collaboration with UNEP and UNEPCOM/USSR.

The first part of this useful international exchange was in the form of a six-day Workshop held at the ICIMOD campus in Kathmandu from July 13-20, 1987. Thirty-eight senior professionals from Nepal, Bangladesh, Bhutan, China, India, Pakistan, Bulgaria, Canada, Switzerland, and the USA participated in detailed discussions on training wi the senior professional staff of ICIMOD and with staff fro UNEP, Nairobi. The focus was on specific erosion problen of the Himalayas. The key issue of the workshop, examine within a comprehensive review of current training efforts the Region, was the necessary interrelationship systematic and relevant training programmes with practic field programmes and projects.

This theme of how best to revitalise conventional form training programmes with practical lessons from fie experience was explored in detail, through the examinatio of *specially-prepared case studies* of specific watershe management projects in the Indian and the Nepale Himalayas.

The second-part of this Expert Meeting was a field stu tour for the participants to examine erosion contr measures in the arid mountain regions of Tadzhikistan in t Pamir Mountains of the USSR from July 21-26, 1987. Th field study visit was organised through the hospitality of t UNEPCOM/USSR.

## *The 1985 Workshop on the Management of National Parks and Protected Areas*

Development and conservation are inextricably related one another. One of the main objectives of development to bring about ecological balance through proper use resources. Although nature conservation is not the o concern of ICIMOD, its importance, particularly in relat to ecologically sound development, has received d attention. This is evident from the fact that one of the fi major activities of ICIMOD, soon after its establishme was to organise, together with the newly established K Mahendra Trust for Nature Conservation, an Internatio Workshop on the Management of National Parks Protected Areas in the Hindu Kush-Himalayas. This w held in May 1985, in Kathmandu, in collaboration with Department of National Parks and Wildlife Conservation His Majesty's Government of Nepal, UNESCO/MA IUCN, and WWF-US.

This international workshop, which was attended by a la number of experts and institutions interested and invol

## WORKSHOPS AND PUBLICATIONS (1984-1988)

*International Workshop on the Management of National Parks and Protected Areas in the HKH Region, Kathmandu, Nepal, May, 1985 - in collaboration with the Department of National Parks and Wildlife Conservation, HMG/Nepal; The International Union for Conservation of Nature and Natural Resources (IUCN); United Nations Educational Scientific and Cultural Organization/MAB Programme; the World Wildlife Fund, US; and the King Mahendra Trust for Nature Conservation, Nepal.*

*International Workshop on Watershed Management in the Hindu Kush-Himalaya, Chengdu, China, October, 1985 - in collaboration with the Chinese Academy of Sciences, China.*

*International Expert Meeting on the Design of Training Programmes in Soil Erosion Control in the Mountain Areas, Kathmandu, Nepal and Tadzhikistan, USSR, October, 1987 - in collaboration with the United Nations Environment Programme (UNEP), Nairobi and UNEPCOM, Moscow.*

Occasional Paper No. 1
**Erosion and Sedimentation Processes in the Nepalese Himalaya**
Brian Carson - August 1985.

Occasional Paper No. 2
**Integrated Rural Development Projects in Nepal: A Review**
Bharat B. Pradhan - December 1985.

Occational Paper No. 3
**Sustaining Upland Resources: People's Participation in Watershed Management**
Anis Dani and J.B. Campbell - July 1986.

Occasional Paper No. 5
**Glacial Lake Outburst Floods and Risk Engineering in the Himalaya**
Jack D. Ives-November, 1986.

Occasional Paper No. 9
**Mountain Environmental Management in the Arun River Basin of Nepal**
John R. Dunsmore - December, 1988.

Proceedings of Symposium
**People and Protected Areas,** May, 1985.

Workshop Report
**Managing Mountain Watersheds**
International Workshop on Watershed Management in the Hindu Kush-Himalaya, Chengdu, China, 1985.

in nature conservation in the Hindu Kush-Himalayas, focussed its discussion largely on how to reconcile the interests of the people with the objectives of protected areas.

The general consensus that emerged was that there is a need for a new management approach which is more responsive to the basic needs of the people and which is willing to involve local people in management. One of the recommendations of the workshop was conservation of the Annapurna Region in Nepal, and this has already been implemented.

*People and Parks (Sanu)*

Another recommendation of the workshop was to encourage neighbouring countries to establish national and joint biosphere reserves. This has not yet materialised. However, the proposed extension of Sagarmatha National Park further eastwards to the Makulu-Barun Area in Nepal, and the establishment of Chomolongma Nature Reserve by China, to the north of Sagarmatha National Park, are encouraging trends in terms of the implementation of this recommendation.

It was also recommended that the *integrated management plans for protected areas* be considered as part of the *National Conservation Strategy*. The emphasis on the integrated approach is obvious. These ideas have been incorporated in the action agenda of the National Conservation Strategy for Nepal which is now being implemented.

## 1989

### *Environmental Management*

By far the most important event of the year was the International Symposium on Mountain Environmental Management held in Kathmandu from 11-14 April. At this Symposium, about 30 case studies, theme papers, and background materials were considered and conclusions drawn. Mountain Environmental Monitoring and Research in the Management of Mountain Ecosystems was the main area of focus. Some of the important conclusions reached are given below.

A number of *institutional issues* emerged from the symposium and one of the key ones was the inadequacy of competent institutions, particularly at the local level. The ability to cope with the complex problems of planning, monitoring, evaluation, and management of the mountains was found to decrease (in number) rapidly, as one moved from the national to the local levels. The five country case studies presented clearly showed that development of institutions at the district, sub-district, and village level, and a reversal of the top-down planning approach, were key issues for sustained development of mountain regions in the context of the Hindu Kush-Himalayas.

The symposium concluded that:

- environmental management in the mountain areas has suffered due to lack of participatory planning and management within institutions rather than from the lack of technology and financial resources;
- due to wide agro-ecological and socioeconomic variations in the mountains, planning for effective resource management needs to be carried out at the local level and needs to take account of those variations; and
- the need to understand the implications of public interventions and markets on mountain environments is necessary to formulate policies and programmes for mountain regions.

*Biophysical characteristics of mountainous areas* were discussed in terms of the need to understand them as a key to controlling erosion processes. The participants also discussed improved management of dams, reservoirs, and associated problems of erosion as a means of lessening sedimentation. The issue of highland-lowland interactions dominated the discussion. Other issues included the role of modern technologies, such as remote sensing, and the role of law in the management of the mountain environment in the Hindu Kush-Himalayan Region.

There is still much that is not understood about biophysical factors and their linkages in the mountains. Moreover, *large and costly infrastructural development projects cannot be maintained without great cost* and are often detrimental to the environment and to its inhabitants. Given these considerations, the symposium arrived at a number of conclusions.

- Mountain dimensions are either not well understood or ignored in infrastructural development or resource management in the mountains. Therefore, mountain biophysical characteristics should be taken into full consideration in designing any infrastructural or resource management project.
- Appropriate impact assessments must be made before constructing any huge and costly infrastructure in the mountains.

## *The Role of ICIMOD*

The Symposium also made a number of recommendations about the role of ICIMOD in these fields.

Recommendations related to *mountain environmental monitoring* issues were as follows.

- ICIMOD should link up with other international systems and act as a focal point for such systems, e.g. UNEP's GRID/GEMS Programme and ESCAP's Programme for mountain areas. It should collaborate in the networking of monitoring stations for mountain areas with other international programmes such as the International Geosphere-Biosphere Programme.
- ICIMOD should develop a Spatial Information System, based on the Remote Sensing and Geographical Information System (GIS), in the countries of the Region, in close collaboration with national agencies.
- Success stories, in the use of GIS/Remote Sensing in developing countries, should be used for practical demonstration.
- ICIMOD should function as a clearing house for the exchange of knowledge on mountain environmental management.
- The programme on Mountain Environmental and Natural Resource Information Systems (MENRIS) to be developed by ICIMOD should:
  - demonstrate the success of environmental monitoring programmes, based on the Spatial Information Systems - the experiences of AIT, Bangkok, and other institutions in Thailand, could be taken as initial examples;
  - train people, not only to enhance and develop their capabilities, but also to create awareness for the best use of the Spatial Information System for environmental monitoring; and
  - wider networks should be established and exchange of knowledge encouraged in mountain environmental management.

Recommendations on *Research on the Management of Mountain Ecosystems* were as follows.

- Research on the management of mountain ecosystems should be guided by the overall objectives of integrated mountain development, sustainability, well-being of mountain communities, especially the poor, and control and minimisation of natural hazards in both the highlands and lowlands.
- ICIMOD should further strengthen its close working relations with universities and research institutions engaged in mountain development, as well as with international agencies and programmes concerned with mountain areas.
- ICIMOD should consider research programmes that lead to improved management of mountain environments in all the major mountain systems of the developing world, e.g. Andean, African, Southeast Asian, and the Hindu Kush-Himalayas.

The Symposium Report "Environmental Management in the Mountains" has been published. Several papers have been produced as ICIMOD Occasional Papers and others are in the process of publication, either as Occasional Papers or as Discussion Papers.

**WORKSHOPS AND PUBLICATIONS (1989)**

*International Symposium on Mountain Environmental Management in the Hindu Kush-Himalayan Region, Kathmandu, Nepal, April, 1989 - in collaboration with UNESCO/MAB.*

*Regional Workshop on Hydrology of Mountainous Areas, Kathmandu, December, 1989 - in collaboration with the Department of Hydrology and Meteorology, HMG/Nepal.*

Occasional Paper No. 6.
**Operational Experiences in Forest Management Development in the Hills of Nepal**
G.B. Applegate and D.A. Gilmour - January, 1989.

Occasional Paper No. 11.
**Highland-Lowland Interactions in the Ganges Brahmaputra River Basin: A Review of Published Literature**
L.A. Bruijnzeel and G.N. Bremmer - July, 1989.

Occasional Paper No. 12.
**Micro-Level Environmental Management Observations on Public and Private Responses in Kakani Panchayat**
Saroj K. Basnyet - June, 1989.

Occasional Paper No. 13.
**Mountain Environmental Management: Nyemo County (Tibet), China**
Zhang Rongsu - August, 1989.

Occasional Paper No. 14
**Natural Resource Management in the Mountain Environment: Experiences from Doon Valley, India**
J. Bandyopadhyay - August, 1989.

Proceedings of Symposia
**Environmental Management in the Mountains**
April, 1989.

## The Future Perspective

### *Studies on Mountain Hydrology*

There is a growing realisation that the science of hydrology, which was developed for the temperate regions of Europe and North America, has serious limitations in its application in the monsoon-dominated and highly varying steep slopes of the Himalayas. Hence, new approaches and studies to understand the hydrology of the Hindu Kush-Himalayan Region are considered to be very important.

For ICIMOD, this becomes particularly important when considered in terms of the huge potential of hydro-power and irrigation within the broad framework of integrated development of the mountains in the Region. Again, the debate on whether upland human activities are causing the problems of siltation and floods in the lowlands can never be resolved unless the scientific understanding of the hydrology of the rivers of the Region is adequately increased.

In tune with this perspective, ICIMOD is undertaking a programme on Mountain Hydrology in the HKH Region, and is working closely with UNESCO/IHP in this regard. In December 1989, together with HMG/N, Department of Hydrology and Meteorology, and UNESCO (New Delhi), a Regional Workshop on the Hydrology of Mountainous Areas was hosted. Two major recommendations of the Workshop; viz, inclusion of a project on Mountain Hydrology as a part of the contribution from the Region under UNESCO/IHP and the convening of a Regional Working Group on Mountain Hydrology; are expected to materialise.

ICIMOD has also developed some proposals on the studies of Mountain Hydrology (e.g. water balance and monsoon hydrology) and, in accordance with the directives of the Board of Governors, is engaged in developing regional projects on this theme for external funding.

### *Development of Proposals*

In 1989, two proposals were developed by this Division. The first was related to *Landslide Inventory and Mapping in the Fragile Hindu Kush-Himalayan Region* and emerged out of the worldwide concern about the devastating impact of natural disasters. This concern was expressed by the General Assembly of the United Nations which passed a resolution on December 19, 1987, to observe the 1990s as the International Decade for Natural Disaster Reduction.

Landslides cost more than $1 billion (U.S.) in economic terms and cause more than 200 deaths each year in the fragile Himalayan Region (30% of the world's total). Large-scale deforestation, unplanned urban growth, and badly engineered mountain roads have rapidly accelerated landslides.

*Landslide on a Mountain Road (M.T. Shah)*

The objectives of this proposal are to design a framework for landslide risk assessment and management in the mountain areas and to initiate systematic activities in landslide inventorisation and mapping in selected areas of the countries of the Hindu Kush-Himalayan Region.

It is proposed that at least one institution from each ICIMOD member country will be identified to carry out this regional project. The expected time-frame covers two years with financial implications totalling $725,000 (U.S.). The proposal has been submitted to UNDP Headquarters, New York.

*Rehabilitation of Degraded Mountain Ecosystems* is the focus of the second proposal. Degradation of the mountain ecosystem in the countries of the Hindu Kush-Himalayas has become a global concern. There has been a considerable decline in the economic well-being of the rural population due to degrading ecosystems. The basic need for survival often compels people to follow ecologically unsustainable methods of resource management, and this triggers the vicious cycle of environmental degradation and growing poverty. Rehabilitation of mountain ecosystems, therefore, demands urgent attention. To tackle both problems of poverty and environmental degradation simultaneously, an integrated approach to development with full ecological consideration needs to be emphasised over a sectoral approach.

ICIMOD is planning to undertake action-cum-research on the scientific rehabilitation of degraded mountain ecosystems. Experimental studies will be carried out under this programme in erosion-prone areas, located in different countries of the Region, in close collaboration with relevant national institutions. This proposed action-cum-research programme is expected to reduce soil erosion and increase productivity within a reasonably short time-frame. The programme is both economically remunerative and environmentally sustainable. It will be carried out in two phases. In the first phase, which is of three years duration, pilot studies will be carried out in the micro-watersheds of four out of six countries; viz, Bangladesh, Bhutan, China, India, Nepal, and Pakistan. The main activity will be the application of Sloping Agricultural Land Technology (SALT), practised currently in the Philippines, to these identified study areas in collaboration with a national agency.

The second phase will consist of (a) extension of SALT into the remaining two countries and (b) monitoring of the impact of first phase activities.

This proposal has been submitted to the UNDP Headquarters, New York. The UNDP has indicated interest in financing this proposal.

**Flood-Deforestation Equations**

The recently published ICIMOD Occasional Paper No. 11, entitled "Highland-Lowland Interactions in the Ganges Brahmaputra River Basin", which gives an extensive review of published literature on natural hazard phenomena in the area under study, refutes the popular claim that upstream afforestation will solve downstream flooding and siltation in the Himalayan Region.

Large-scale sedimentation is generated through natural processes and evidence clearly indicates that vegetation and land use practices exert influences on the amount (total water yield) and timing (peak flows, dry season flows) of stream flows in catchment areas of less than 500 $km^2$. The effect tends to disappear with an increase in area.

At the macro-level (e.g. in large basins) the impact of deforestation or excessive grazing and cultivation on steep slopes in upland watersheds can be said to have almost insignificant impact on floods, low flows, and sediment flow in lowland areas. The often quoted causal relationship between deforestation in the Middle Himalayas and flooding in the Gangetic plains or in Bangladesh is therefore questionable.

Devastating and widespread flooding is usually the result of periods of prolonged and intense rainfall, particularly when such rainfall occurs after soils have already been thoroughly saturated with water, so that any accommodation of extra water becomes remote. This implies, therefore, that it is **storage capacity** rather than **infiltration** capacity of the soil which influences lowland flooding. In other words, the presence or absence of forest cover has least influence under such extreme circumstances.

The paper also refers to evidence collected at micro-level (e.g. in small watersheds); where sediment load is strongly influenced by human activity; which indicates that reforestation **does** have a positive impact in controlling soil erosion and sedimentation at the local level.

# Part II

# Dissemination and Action Programmes

*It was during 1989 that the four service-oriented programmes of ICIMOD were finally established. These are*

*Programme V : Documentation and Information Exchange;*

*Programme VI : Natural Resources Assessment and Monitoring;*

*ProgrammeVII : Area Development and Implementation; and*

*Programme VIII : Institutional and Professional Development.*

*Programme V and Programme VIII were already in existence but their functions are now in a stage of expansion and upgrading. Programmes VI and VII were established for the first time in 1989 as separate programmes. These four programmes, as we have stated above, are distinctly service-oriented, and they are intended to fulfill the objectives of Article 1 of ICIMOD's mandate. Services provided are in the form of new and repackaged information; computer processed data and maps; policy and planning advice; and skills' training and advisory services. They depend heavily on modern communications' technology; and in this respect the programmes will grow in efficiency and effectiveness once computerisation is achieved and networking between different work stations is completed. ICIMOD expects to complete the networking process for its own terminals by the end of 1990 and among different national focal points by 1992/93.*

# Documentation and Information Exchange

## Rationale

**One of the four main functions of ICIMOD's role as a facilitator of development is to build a multidisciplinary documentation centre on integrated mountain development based on the systematic exchange of knowledge and experiences through an organised information network.**

## Focus

The basic goal of the Centre's Documentation and Information Exchange Programme is to make available or access the information relating to various disciplines of mountain development, suitably consolidated, digested, and repackaged to match the needs and nature of its clients. An important "parallel goal" is the simultaneous development of means to sustain its flow by enhancing the national capacities for information management.

The programme seeks to meet both the bibliographic (documentary) and non-bibliographic information needs of its clients. The bibliographic part covers conventional and non-conventional documents, and the non-bibliographic part covers research-in progress (ongoing projects/ programmes) and consolidated information (reviews, state-of-the-art reports).

To achieve this objective, ICIMOD commenced by building a sound information base on mountain development. The development of this base is closely aligned to the overall goals and programme development within the Centre. Through this process, a core information base has been set up with a strong emphasis on current and planned subject areas of concern.

Apart from in-house professionals, the Centre's information clients are researchers, development practitioners, government and non-government institutions, international agencies, students, and other users. Local enquiries through direct visits to the Library are readily responded to by our library and documentation staff. Other information needs of individuals and institutions, in member countries and elsewhere, are met through correspondence, publications' exchange, and other dissemination tools.

Currently, the information system consists of four subsystems.

- Acquisition (document collection and information gathering).
- Processing (cataloguing, consolidation, repackaging, and organising in databases).
- Dissemination (publishing/documentation services).
- Information exchange (networking).

Documentary information constitutes the most widely used and the major component of the information system. This has, therefore, been given due priority within the Programme.

## 1984 to 1988: Laying the Foundations

In the first four years of operation, the emphasis was on the acquisition of documents and the manual preparation of accession lists. It was also during this early period that the identification and recruitment of professional staff took place.

Commencing in 1984, a succession of consultants/missions were invited to design programmes and refine the organisation of ICIMOD's information system. One of the most significant of these was the UNESCO mission in 1984.

It recommended that: *"ICIMOD's information and documentation system be established in the form of a regional network for the exchange of information on integrated mountain development and related fields among its member countries on the following basis:*

- using existing, sectoral, national, regional, and international systems and networks capable of providing relevant information through a system of intercommunication and linkage;
- making all outputs available on request through established working lists;
- facilitating access of the countries to information received elsewhere and vice versa;
- establishing a National Information Unit for Mountain Development (NIUMOD) in each member country; and
- organising clearing-house, cataloguing, indexing and abstracting, current awareness, retrospective bibliographic search, translation, referral, analysis, advisory, audio-visual, and training services for information professionals in the mountain development field."

These recommendations have been pursued within the framework of the facilities and funds available.

As of 1988 there were 9,713 documents in the library. A breakdown of documents in the library and the annual additions have been given under the section on 1989.

In 1987, the programme installed its first computer and computerised inputting commenced. The documents acquired are catalogued, indexed, and entered into the relevant databases for quick retrieval. We have two bibliographic databases; one for books and one for serials.

## 1989

In 1989 ICIMOD established exchanges with important institutions and information networks in response to increasing user demands and the high cost of publications. Other activities included providing consultancy services to national institutions.

*Training in Progress (A.A. Chaudhry)*

In fulfilling these objectives the following activities took place.

- A training course for Nepalese scientists was organised from 25 to 29 September, 1989, in collaboration with UNESCO.
- Due to the absence of a keyword list or thesaurus to cover subjects of interest to ICIMOD, an indexing vocabulary containing 2,143 keywords, to cover a wide range of subjects on mountain development, has been developed, by adopting and adapting keywords from more than six thesauri. Where needed, new keywords are added.
- In order to know the information needs of our clients more precisely and to monitor the use of information resources, readers' databases and searches' databases have been established.
- The programme has been designated as a specialised distributor of CDS/ISIS for the ICIMOD Region.

- The micro CDS/ISIS version 2.3 is being used. As this system caters mainly to automation of catalogues only, utilities have been developed for spell checks against authority files and back and forth data transfer among ISIS, INMAGIC, and dBASE.

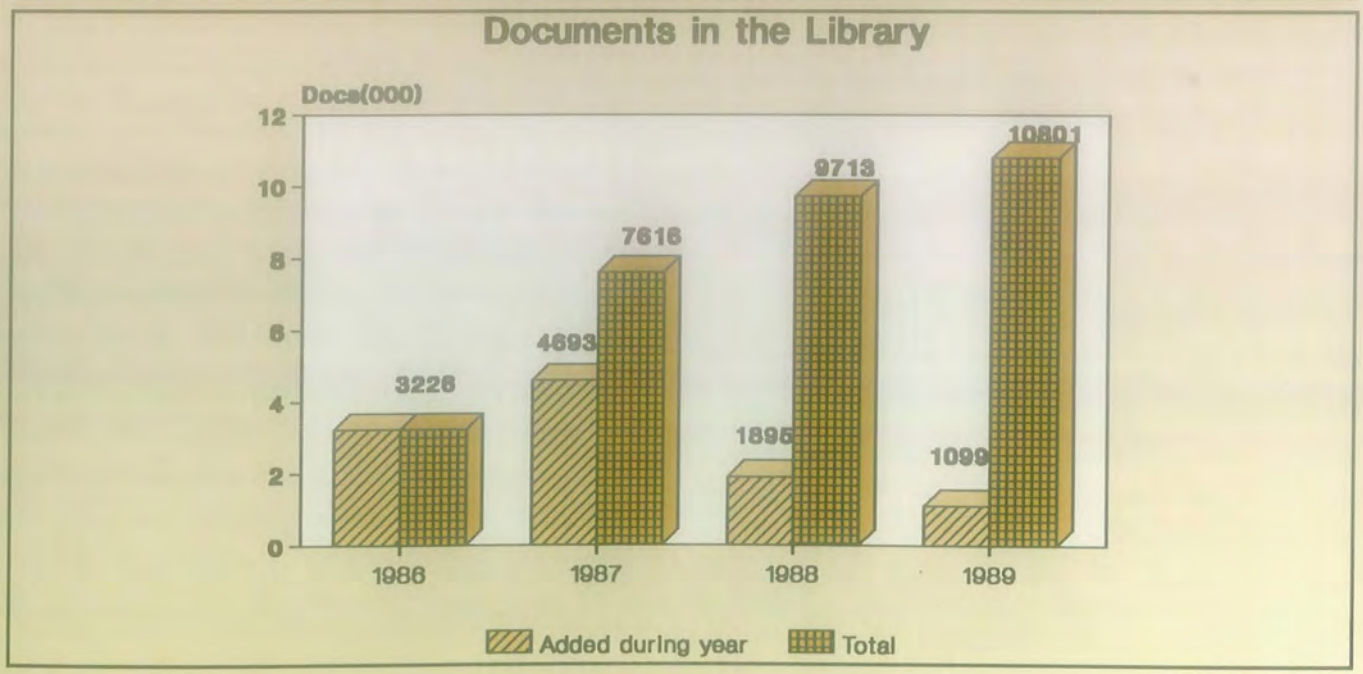
Of the computerised bibliographic databases - to date the books' database has 8,236 records and the serials' database has 520 records.

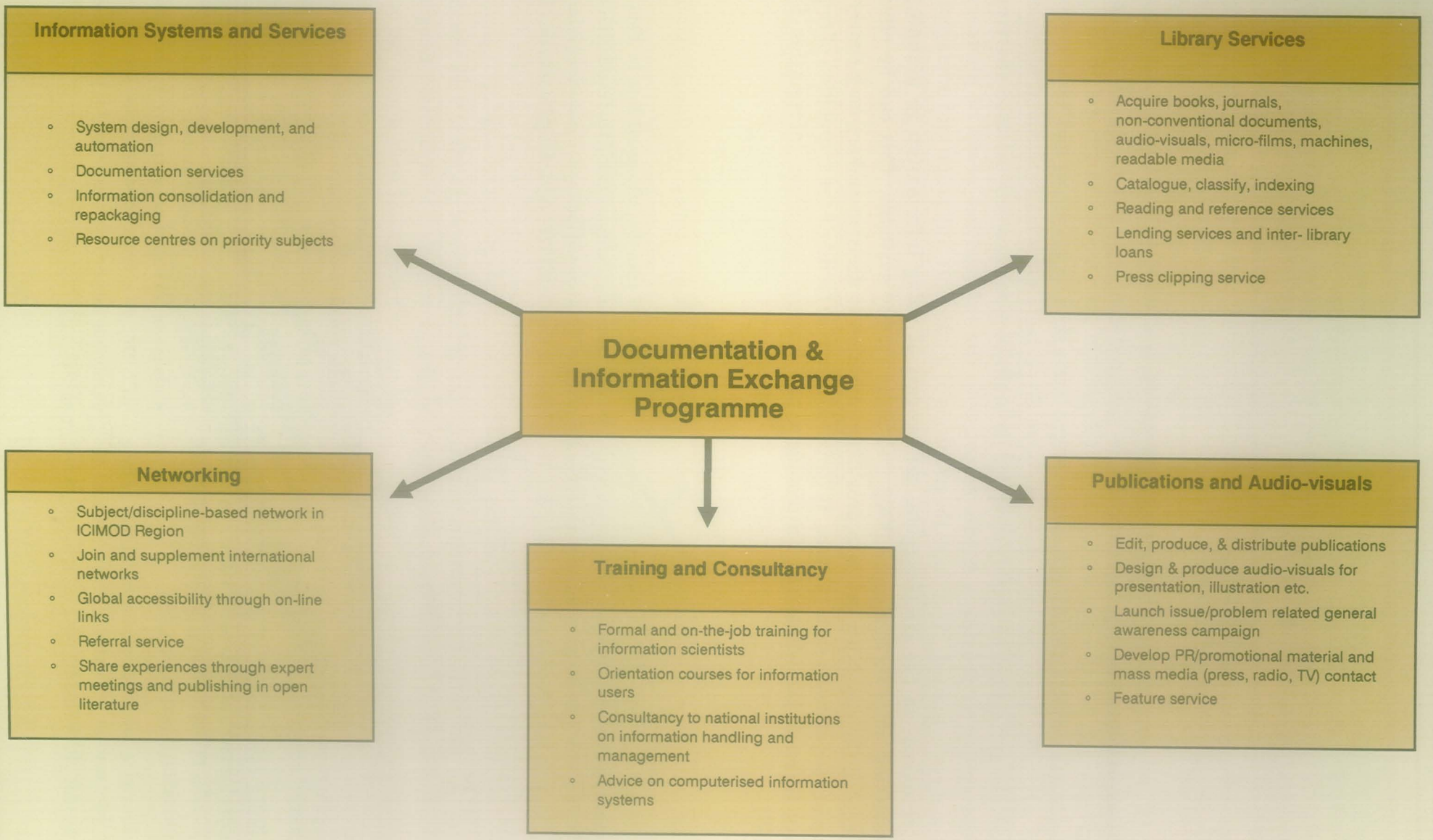
## The Future Perspective

In 1990 we hope to expand our abstracting services, especially in relation to Chinese documents. We are also considering the identification of national focal points in the regional countries with a view to wider dissemination of information. In the context of publications, the programme will explore methods of streamlining the processing of documents and the establishment of an ICIMOD "in-house" style.

### DOCUMENTATION SERVICES

| | |
|---|---|
| New Documents in the Library: | A bimonthly output of the books' database. |
| New Serials in the Library: | A fortnightly output of the serials' database. |
| Bibliographies: | The following bibliographies have been prepared and published:<br>- Rural Energy Planning and Management (1,455 references)<br>- Himachal Pradesh (101 references)<br>- Rural development (558 references) |
| Retrospective Database Searches: | Based on specific demands by users, 20 searches, retrieving about 1,700 references, have been provided. |
| Document Supply: | Photocopies of approximately 1,000 pages per month have been provided to users. |
| Publications: | The Division provided editorial facilities for most of the Centre's publications. These publications are distributed to about 1,500 concerned institutions and individuals in 68 countries. |




Information Systems and Services
System design, development, and automation
Documentation services
Information consolidation and repackaging
Resource centres on priority subjects
Library Services
Acquire books, journals, non-conventional documents, audio-visuals, micro-films, machines, readable media
Catalogue, classify, indexing
Reading and reference services
Lending services and inter- library loans
Press clipping service
Documentation & Information Exchange Programme
Networking
Subject/discipline-based network in ICIMOD Region
Join and supplement international networks
Global accessibility through on-line links
Referral service
Share experiences through expert meetings and publishing in open literature
Training and Consultancy
Formal and on-the-job training for information scientists
Orientation courses for information users
Consultancy to national institutions on information handling and management
Advice on computerised information systems
Publications and Audio-visuals
Edit, produce, & distribute publications
Design & produce audio-visuals for presentation, illustration etc.
Launch issue/problem related general awareness campaign
Develop PR/promotional material and mass media (press, radio, TV) contact
Feature service

# Natural Resources Assessment and Monitoring

## Rationale

**The use of resource and environmental information is critical to the effective creation and implementation of programmes and policies. The ability to create and implement effective policies and programmes in this dynamic environment is dependent upon a quick and thorough analysis of current resources, assets, limitations, and changes. Some data on resources and environment are currently available. However, such data are often dispersed among many national agencies and other locations and cannot be quickly compiled for multi-sectoral, problem-oriented analyses. As a result, the ability to provide a timely response to the information needs of planners and decision-makers is limited. To address the problems of inadequate utilisation and management of natural resources in the HKH Region, the process of using information in planning and decision-making must be institutionalised and made readily available. This can be effectively implemented if the capability exists to provide information to decision-makers on a timely basis through analyses of multi-sectoral data. ICIMOD attempts to facilitate the acquisition of required capability through the Mountain Environment and Natural Resources Information System (MENRIS)**

## Focus

The main objective of MENRIS is to assemble, manage, and disseminate environmental and natural resource data and information, in a form useful to decision-makers and planners, and to help formulate strategies for the sustainable development of HKH mountain regions commensurate with the need to reverse the current trend of resource and environmental degradation and the consequent deterrence of economic development. The principal elements of MENRIS include:

- implementing a remote-sensing based, computerised Geographical Information System (GIS);
- assisting establishment of natural resource and environment centres in ICIMOD Member Countries through training in data collection and information dissemination; and
- encouraging the development, exchange, and use of information on natural resources and the environment to support sustainable development.

## 1984 to 1988: Laying the Foundations

The MENRIS idea was discussed first in 1986. At its seventh meeting (February 1986), the Board of Governors of ICIMOD discussed the need to provide an information base such as the GIS (Geographical Information System) which would provide the necessary institutional capability to implement a data bank to evaluate changes in the regional environment of the Hindu Kush-Himalayas. A remote-sensing based, computerised Geographical Information System (GIS) could provide the necessary mechanism. The implementation and utilisation of such a system would lead to improved decision-making and programme planning to address the critical resource and environmental issues of the Hindu Kush-Himalayan Region. Subsequently, the Centre's proposal to establish MENRIS was taken up with ADB (Asian Development Bank), Manila. Following a series of discussions both in Kathmandu and Manila, during 1988, the concept of MENRIS, as a dynamic information system, received unanimous support and was ready for preparatory work in 1989.

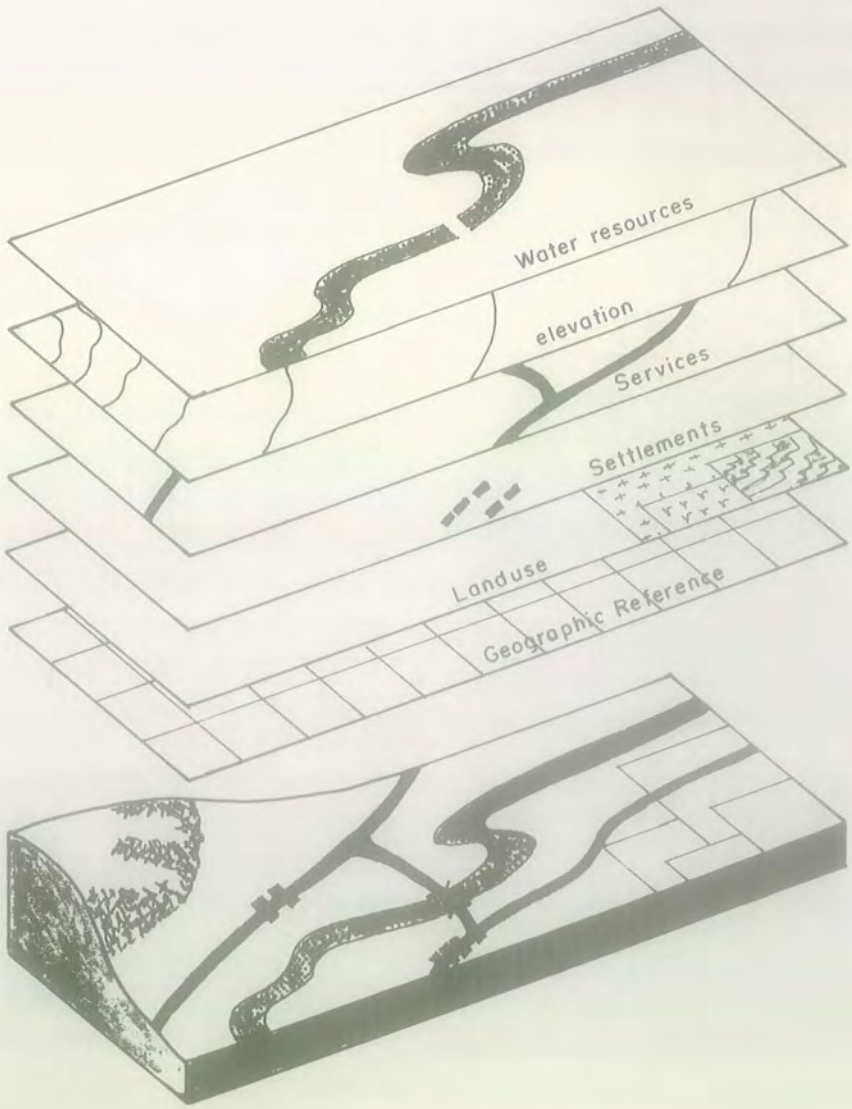
## 1989

Ongoing work in 1989 involved identifying donors and assessing the needs in terms of hardware, software, and technical expertise. A group of donors interested in supporting this programme was identified and approached. It included ADB, ODA, UNEP-GRID, and UNITAR. Discussions were held with a view to signing memoranda of understanding. The estimated amount of total funding at this stage is U.S. $ 1 million.

## The Future Perspective

It is envisaged that the funds acquired will be used to purchase the necessary equipment in 1990. During 1990, also, the training of staff will commence, and the programme will become operational by the third quarter of the year. This is a new programme and will provide an added dimension to all our activities, by filling the lacunae in our knowledge with the up to date environmental and natural resource data.

### Integration of Environmental Data within a Geographical Information System



# Area Development Planning and Implementation

## Rationale

**Valid conclusions on the planning of integrated mountain development cannot be drawn on the basis of abstract research but have to be arrived at by actually performing such planning exercises in specific geographical areas.**

## Focus

The premise of this programme is to rectify the inadequate attention given to environmental issues, economic complementarities, and mountain characteristics, in planning and implementation. It aims to develop practical approaches for integrating basic needs' fulfilment, environmental management, and economic development in mountain areas.

As all development activities are organised on the basis of various area units, an area-based approach not only provides better insights regarding different linkages among sectors, areas, and institutions, but also assists in determining the types of responses that are practically feasible. As it cuts across multiple dimensions of planning, organisation, and management, recommended solutions arising from this approach tend to be more holistic and integrated. Given the fact that mountain areas are characterised by wide-scale heterogeneity, an area-based approach to planning and implementation is more likely to appreciate the special conditions for specific locations and is in a better position to provide a basis for improved planning and implementation. Such an approach underscores the role of decentralised decision-making and participatory management. For ICIMOD, this programme will provide an important opportunity to directly contribute to the efforts of various national institutions in the development of specific areas. On a wider scale, ICIMOD, through a process of learning, can help to improve overall mountain policies and programmes for integrated mountain development.

## 1984 to 1988: Laying the Foundation

This is a new programme activity for ICIMOD. However, the concept of this programme did evolve from the "realities" uncovered by ICIMOD research in the early years. It was realised that a programme was needed to conduct work on methods of enhancing institutional capabilities and planning systems for more effective area-based development and on methods of enhancing policy and programme sensitivities to mountain specificities -- both opportunities and constraints.

## 1989

Promotion of sustainable development policies that effectively integrate economic development options with environmental concerns are extremely important in countries with extremely fragile mountain areas. The need to reverse the trends in environmental degradation and increase production and productivity to provide for basic human needs are the twin challenges facing developing mountain regions. Existing policies by and large have not attempted to integrate economic and environmental concerns. A re-orientation of policies is therefore essential to meet these challenges. An examination of existing policies and programmes in terms of their sustainability will therefore be an initial step towards formulating suitable policies for promoting sustainable development.

A significant activity was initiated in October 1989, in Manila. Following the publication of "Our Common Future" in April 1987, the Asian Development Bank mobilised a special technical assistance fund to "*examine the existing economic and environmental policies and programmes of*

*selected DMCs which are supportive of or which constrain implementation of the Commission's recommendations".*[1]

A number of countries were selected to take part in this exercise, and Nepal was one of them. The other Hindu Kush-Himalayan country chosen was Pakistan.

This programme thus became responsible for producing a report on "Economic Policies for Sustainable Development in Nepal." The main objectives of this study are to identify the major components of sustainable development and the extent to which existing and proposed development plans and policies support or are in conflict with the progressive achievement of sustainable development. More specifically the study will:

- examine various macro-economic variables and environmental parameters in terms of their current and most likely future trends;
- examine different sectors and particularly population and human resources, agriculture, natural resources, energy, tourism, industry, and urban development for their respective roles in reducing poverty and environmental problems;
- assess national and sub-national or regional plans and programmes for their respective roles in poverty eradication and environmental management including the extent to which they are supportive or in conflict with each other;
- evaluate the impact of specific programme and project interventions (such as the Community Forestry Project, Small Farmers' Development Programme, etc) made to assist vulnerable groups and restore the quality of environmental resources and the extent to which these specific interventions are being integrated with the general programmes and policies; and
- evaluate the institutional capacity to formulate, implement, and manage a programme of sustainable development at various levels.

The draft report is due in May 1990.

## The Future Perspective

In addition to the draft report on "economic policies for sustainable development", a proposal on the Integrated Regional Economic and Environmental Development Planning for the Bagmati Zone, submitted to the Asian Development Bank for approval through the National Planning Commission of Nepal, will hopefully be approved by the ADB in 1990.

The initial exercise will be conducted within the Bagmati Zone of Nepal in association with the National Planning Commission. The Bagmati Zone lies in the Central Development Region and contains Kathmandu Valley, the most urbanised region in the country. It has an area of 9,400 square kilometres and a population of about 1.8 million (1981 census). The physical and institutional infrastructure provides considerable potential for transforming the agricultural sector. At the same time, it is faced with classic development problems such as rapid population growth, urbanisation, rural-urban migration, and depletion of natural resources.

Development planning, up to the Seventh Five-Year Plan in Nepal, has been primarily project or sector-oriented. Area development programmes that are currently implemented mainly consist of district level Integrated Rural Development Programmes. The major objective of these rural development programmes was to rapidly improve the socioeconomic well-being of the people through decentralisation and vastly increased multi-sectoral district development activities. This was in contrast to the previous situation where the centre played a major role even in limited scale district development activities. The experience so far has clearly indicated that even with the vastly

1 Asian Development Bank, 1989.

increased support for projects, the demand has far exceeded the resources available, resulting in serious dilution of development efforts. Economic viability of many projects undertaken has been increasingly questionable.

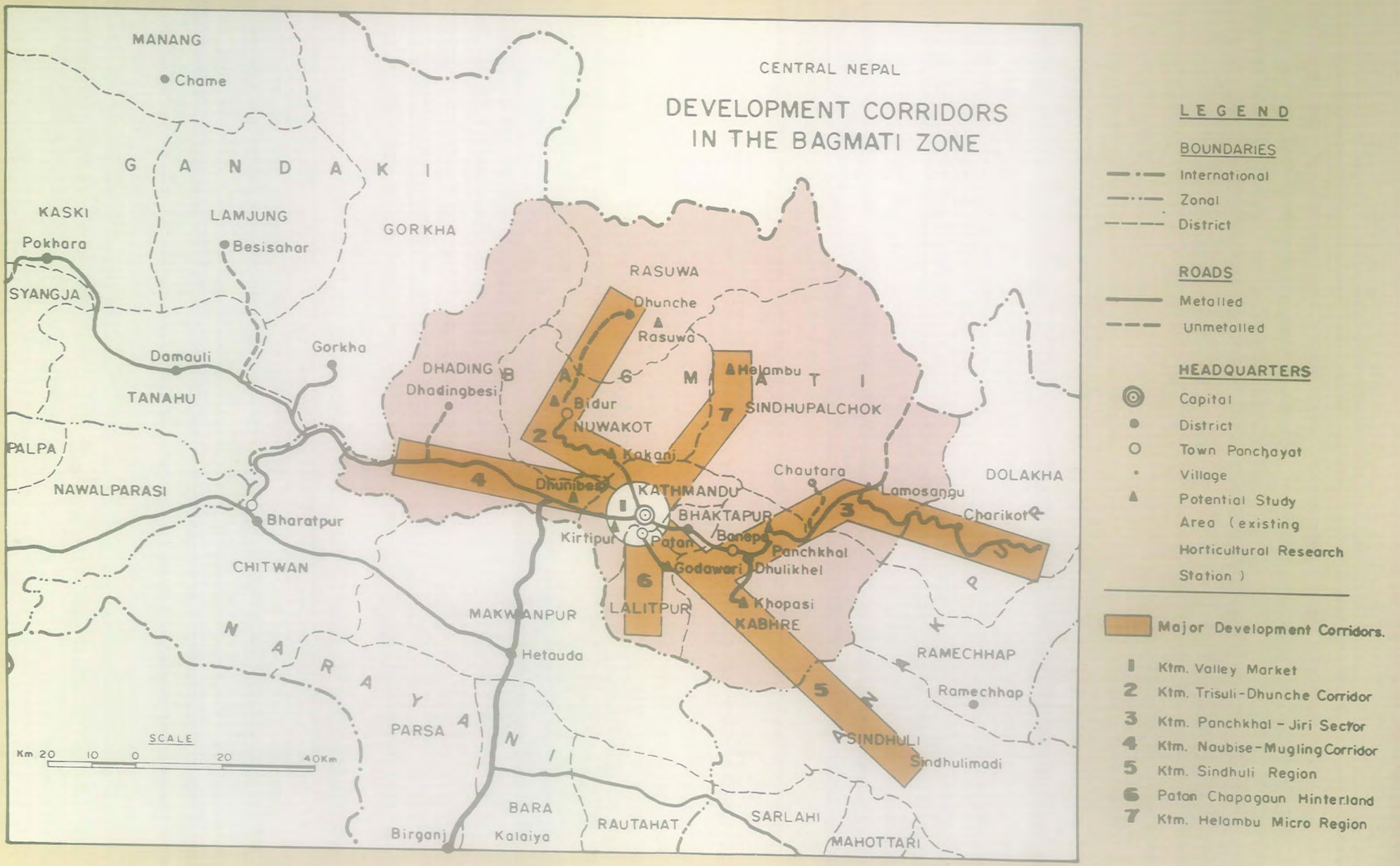
If sectoral line agencies have been reluctant to decentralise their programmes, district level management and implementation capacity has also not demonstrated any significant improvement. More fundamentally, project activities have not resulted in creating a process of sustained economic improvements, and management of the fragile environment has been virtually overlooked.

In the particular context of meeting the basic needs of the poor, management of the environment, and ensuring a process of sustainable development, a closer examination of the broader developmental and environmental options has become essential. Without such a framework, ad-hoc collection of local project activities, as evident under the Integrated Rural Development Programme, will continue to be influenced by various types of non-economic forces. Through a careful evaluation of the long-term alternatives that integrate economic and environmental concerns, it will be easier to establish short and medium-term priorities that could then become the focus of integrated rural development projects.

The major objective of the study is to develop a long-term framework for regional and local level planning in the Bagmati Zone. The exercise will contribute to the development of a regional database and the identification of problems related to institutional development. The purpose is to evolve a system that allows for effective resource management and integrated planning and implementation. Practical methodologies for regional and local level planning will be formulated and tested. Their wider application to other mountain regions in the Hindu Kush-Himalayas will subsequently be carried out.

Bagmati Zone has been identified because of the existence of a number of development corridors (Map) that arose after the construction of an extensive network of roads in the Bagmati Zone[2]. A number of sub-regions subsequently evolved and agricultural specialisation began to take place along with market integration. Very little of this was planned but was simply a response to a number of haphazard programmes and development interventions. Nevertheless these development corridors did emerge, and the future work of the Area Development and Planning Programme will concentrate on exploring the possibilities for development given an integrated framework and a long-term planning perspective.

2 Banskota, M. Hill Agriculture and the Wider Market Economy: Transformation Process and Experience of the Bagmati Zone in Nepal. ICIMOD Occasional Paper No. 10, pp 45, 47, and 48. Kathmandu: ICIMOD, 1989.




LEGEND

BOUNDARIES
- International
- Zonal
- District

ROADS
- Metalled
- Unmetalled

HEADQUARTERS
- Capital
- District
- Town Panchayat
- Village
- Potential Study Area (existing Horticultural Research Station)

Major Development Corridors.
1. Ktm. Valley Market
2. Ktm. Trisuli-Dhunche Corridor
3. Ktm. Panchkhal - Jiri Sector
4. Ktm. Naubise-Mugling Corridor
5. Ktm. Sindhuli Region
6. Patan Chapagaun Hinterland
7. Ktm. Helambu Micro Region

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# Institutional and Professional Development

## Rationale

**Strengthening institutional and professional capacity in integrated mountain development is the key to promotion of sustained development.**

## Focus

The focus of the programme is in two areas. These are the design of training modules and training of trainers and a professional development programme. The idea of the latter is to encourage exploratory thinking and to provide a unique opportunity for professional growth to individuals of exceptional achievement. The focus of the training component is to engage training specialists in designing modules that convey appropriate messages in clear and effective ways, in line with the thematic research and development programmes of the Centre.

## 1984 to 1988: Laying the Foundations

Training programmes were conducted and, furthermore, upon return to their respective countries, trainers were provided not only with training materials (e.g. training manuals, audio-visual materials, and other relevant documents) but also with the techniques of training.

In 1986, the *Professional Development Programme* was initiated. The programme has two components: **Senior Research Fellowships**, given to individuals of recognised stature for extended sabbatical work, and **Small Research Awards**, for more junior professionals who have shown the potential of making important research contributions given the necessary support. Unlike many similar programmes, however, ICIMOD's programme is not restricted to academics. For potential recipients, it looks out also for outstanding professionals and government officials who can draw upon their working experience to make contributions with immediate and practical impact on regional development problems.

## 1989

One programme that started in 1986 culminated in 1989. This is the *Senior Research Fellowship Programme*. Under this programme, the focus has been on the engagement of senior professionals and their interaction with ICIMOD professionals on a mutual learning basis in terms of "seminal thinking" about integrated mountain development.

Senior Research Fellowships represented by far the larger commitment of resources and research effort. Funding was provided through a generous 3 year grant of U.S. $ 220,000 to ICIMOD in 1986 by the Ford Foundation. Each Fellowship covered a duration of three to nine months, depending upon the time available to the recipient who was supported with up to U.S. $ 25,000 for living expenses, travel, field work, and a monthly stipend. (An ICIMOD Guest House was established in Kathmandu in 1987 to eliminate the need for hotel accommodation and other programme resources). Eligible candidates with expertise relevant to ICIMOD's research priorities were identified through informal contacts and queried about participation in the programme. Upon the candidate's acceptance, a proposal detailing his or her research subject, methodology, and work schedule was submitted to the Centre. Upon completion of the research, the results were presented in a public forum and published as part of a special ICIMOD series. This also provided input support for various ICIMOD programmes, workshops, and seminars. Under this programme, eight Fellowships were awarded during the period 1986-1989. The Ford Foundation support for this programme came to an end in 1989. ICIMOD is presently exploring regular support for the programme through interested donors.

Under *Small Research Awards*, smaller grants were made available to young professionals and graduate students to encourage small-scale independent research on topics related to mountain problems and issues. This has proved to be very useful and cost effective. Depending upon the availability of funds, this activity is expected to grow. It is intended to extend this award to other researchers with similar interests, although not necessarily working towards a degree.

Those who have contributed to this programme, and who have been able to make a meaningful contribution to ICIMOD through it, are listed below. The period covered is up to and including the current year, 1989.

## Senior Research Awards as of December 1989

As mentioned above, the Senior Research Fellowship Awards enabled the Director to make awards to between eight to ten scientists in the Hindu Kush-Himalayan Region. The following briefs describe some of the work already undertaken by those receiving fellowships.

| *Fellow* | *Topic* |
|---|---|
| *Dr. Tirtha B. Shrestha (Nepal)* | *Development Ecology of the Arun River Basin* |

**Dr. T.B. Shrestha**, one of Nepal's most distinguished scientists, was the first to receive a fellowship award. A Himalayan botanist and ecologist of international distinction, Dr. Shrestha carried out research on the mountain ecosystems of the Himalayas of Eastern Nepal. This resulted in the publication of his work in a book entitled "The Development Ecology of the Arun River Basin".

| *Fellow* | *Topic* |
|---|---|
| *Dr. Noor Mohammad (Pakistan)* | *Rangeland Management in Pakistan* |

**Dr. Noor Mohammad**, Director, Range Management and Forestry, Pakistan Agricultural Research Council, produced a volume on **Rangeland Management in Pakistan** that reviewed the progress and achievements made in rangeland development and discussed how the findings could be utilised by other countries with mountain regions.

| *Fellow* | *Topic* |
|---|---|
| *Dr. Tej Vir Singh (India)* | *Impact of Tourism Development in Mountain Areas: Study of Manali in the Kulu Valley, Himachal Pradesh* |

**Dr. Tej Vir Singh**, Director, Centre for Tourism Research, Lucknow, India, conducted a case study of the "Impact of Tourism Development in Mountain Areas". This case study by Dr. Singh looks at the specific experience in Manali in the Kulu Valley of Himachal Pradesh. The overall findings on the economic and environmental impact of tourism are positive, because tourism has not damaged the environment. This has been attributed to environment-oriented resort planning and careful use of available resources. The overall economic impact is also positive, although the local share of economic benefits is still relatively small. The author emphasised the need for people's participation in order to better integrate tourism with hill agriculture, environment, and local retention of the benefits from tourism.

| *Fellow* | *Topic* |
|---|---|
| *Dr. J. Bandyopadhyay (India)* | *Economic Development and Ecological Stability in the Garhwal Himalayas* |

**Dr. J. Bandyopadhyay**, former Faculty Member, Indian Institute of Management, Bangalore, and currently a professional staff member of ICIMOD, is conducting a study on the problems and prospects of economic development in the Garhwal Region of Uttar Pradesh, India, with special emphasis on the area of Tehri. He is trying to place the ecological sensitivity of the natural resource endowments of the region into the framework of the dynamic perspective of changes in management strategies and utilisation. This study is expected to come out with recommendations for sustainable economic development in Garhwal and will be completed in 1990.

| *Fellow* | *Topic* |
|---|---|
| *Professor Li Wenhua (China)* | *The Forests of the Himalayan-Hengduan Mountains of China and the Strategy for Their Sustainable Development* |

## SMALL RESEARCH AWARDS AS OF DECEMBER 1989

| Name | Amount | Year | Purpose |
|---|---|---|---|
| 1. Dr. Sumitra Gurung | $ 3,000 | 1985 | To conduct Ph.D. research work on the topic "The Socio-economic Consequences of Landslide Hazards in Kakani - Kathmandu (Nepal)" Ph.D. Candidate in Geography at the University of Hawaii, U.S.A. |
| 2. Dr. John J. Metz, Dept of Geography, University of Wisconsin, U.S.A. | $ 1,800 | 1986 | Quantitative Assessment of Forest Use Practices of a High Elevation Magar Village, Chimkhola, Nepal. Ph.D. Candidate. |
| 3. Krishna P. Belbase Dept. of Agricultural Economics Cornell University | $ 2,000 | 1988 | "Assessment of Technological Change in Nepal's Hill Agriculture" study in Nuwakot District. Ph.D. Candidate. |
| 4. Integrated Development Systems (IDS) | Rs.135,000 | 1989 | Jharkot Electrification Scheme Baseline Study |
| 5. Madan P. Pariyar | $ 6,000 | 1989 | Manufacturing and Testing of AIT/JAB Seeder in Nepal. M.S. Student at AIT. |
| 6. Mr.Bishna Nanda Bajracharya | $ 2,500 | 1989 | Small Towns and Rural Development: A Case Study of Urban Rural Relations in the Bagmati Zone. Ph.D. Candidate in Geography at the University of Hawaii, U.S.A. |
| 7. Godavari Alumni Association | Rs. 50,000 | 1989 | Development of Beekeeping and Design of Community Irrigation System in Godavari. |
| 8. Environmental Engineering Division, Asian Institute of Technology | $ 1,000 | 1989 | Water Pollution Assessment of Phewa Lake, Pokhara. (Support for Mr. Krishna Rana's research) |

**Professor Li Wenhua**, Vice Director, CISNAR, Chinese Academy of Sciences, Beijing, is carrying out a study on "The Forests of the Himalayan - Hengduan Mountains of China and the Strategy for Their Sustainable Development". The study will contribute to ICIMOD's Programme on Strategies for Mountain Environment and Forest Management.

| *Fellow* | *Topic* |
|---|---|
| *Dr. L.R. Verma (India)* | *Beekeeping and Hill Farming in the Hindu Kush-Himalayas: Scope and Strategies for Development* |

**Dr. L.R. Verma**, former Professor, Department of Bio-Sciences, Himachal Pradesh, University of Shimla, and currently a professional staff member of ICIMOD, carried out research on beekeeping in the context of integrated mountain development; in view of its particular significance for the hill farmer as an income enhancement activity that does not increase the pressure on limited land resources.

| *Fellow* | *Topic* |
|---|---|
| *Professor Iqbal Shah (Pakistan)* | *Livestock Production and Management in Mountain Areas of Mansehra* |

**Professor S. Iqbal Shah**, Chairman, Department of Livestock Management, the NWFP Agricultural University, Peshawar, Pakistan was granted a Senior Research Fellowship to work on Livestock Management in the Mansehra District of Pakistan.

| *Fellow* | *Topic* |
|---|---|
| *Professor Wang Sijing (China)* | *Environmental Geology for Strategic Development Planning in the Hengduan Mountains of China* |

**Professor Wang Sijing**, Director, Institute of Geology, Chinese Academy of Sciences, was awarded a Senior Fellowship to work on "Environmental Geology for Strategic Development Planning in the Middle Hengduan Mountains of China". This research will emphasise geo-environmental factors in the integrated economic and infrastructural development of the region.

## The Future Perspective

This is currently a relatively small programme within ICIMOD; but it is expected to grow steadily in the years to come. The first priority, in this regard, will be the further development of practical training manuals and other training aids. This requires close cooperation between technical experts and training specialists. The demand for training in communication and computer skills will increase considerably. The greatest challenge will be to establish close working relationships with relevant institutions in the HKH Region, in order to develop an active network of collaboration. The availability of funds for research and training assignments on different scales will enhance professional and institutional development and will facilitate the accomplishment of research assignments.

# Information on Administration and Finance

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His Majesty's Government, Nepal

# The Professional and Senior Administrative Staff of ICIMOD

As of the 31st December, 1989, the professional and senior administrative staff of ICIMOD had thirty-six members. They came from different countries of the Region, from Europe, and from the U.S.A. Their names have been listed below.

### Directorate

| | |
|---|---|
| Dr. E. F. Tacke | Director |
| Dr. Ram P. Yadav | Deputy Director |
| Mr. Surendra Shrestha | Chief Administrator |
| Dr. Mahesh Banskota | Chief Programme Coordinator |

### Mountain Farming Systems

| | |
|---|---|
| Dr. N. S. Jodha | Division Head |
| Dr. L. R. Verma | Apiculture |
| Dr. Tej Partap | Mt. Farming & Crop Genetics |
| Dr. Liu Yan Hua | Economic Geography |
| Prof. Lu Rongsheng | Horticulture |
| Mr. Sugandha Shrestha | Animal Husbandry |
| Ms. Jeannette Denholm | Forest Management |

### Population and Employment

| | |
|---|---|
| Dr. Deepak Bajracharya | Division Head |
| Mrs. Prabha Thacker | Women & Development\Info.Science |
| Dr. Pitamber Sharma | Mountain Demography |

### Mountain Infrastructure and Technology

| | |
|---|---|
| Mr. Lakpa Tsering | Division Head |
| Mr. Birendra Deoja | Mountain Roads and Infrastructure |
| Mr. Bhaskar Thapa | Mountain Infrastructure |

### Mountain Environmental Management

| | |
|---|---|
| Prof. Li Tianchi | Division Head |
| Prof. Suresh Raj Chalise | Mountain Ecosystems |
| Dr. Jayanta Bandyopadhyay | Environmental Management |
| Prof. Sun Jizheng | Applied Ecology |
| Mr. Balram Bhatta | Forest and Watershed Management |

### Documentation and Information Exchange

| | |
|---|---|
| Mr. Anwar Ali Chaudhry | Division Head |
| Prof. Hu Zhenou | Documentationist |
| Mrs. Greta Rana | Editor |

### Area Development Planning and Implementation

| | |
|---|---|
| Dr. Krishnakumar Panday | Fodder Management |
| Dr. Hikmat Bista | Rural Development |
| Mr. Saroj Basnyet | Development Planning |
| Mr. Suresh Sharma | Energy Economics |
| Dr. S. S. Teaotia | Horticulture |

### Computer Section

| | |
|---|---|
| Mr. Pramod Pradhan | Computer Analyst |
| Mr. P.K. Kotta | Computer Analyst |

### Finance and Administration

| | |
|---|---|
| Mr. Milan Raj Tuladhar | Chief Accountant |
| Mr. Ruben Subba | Administrative Officer |
| Mr. C.B.S. Kansakar | Administrative Officer |
| Ms. Priya Trosuwan | Administrative Officer |

# Income and Expenditure Account

The financial management of the Centre is implemented through the establishment of Core Funds and Project Funds. All unrestricted contributions made by sponsors and member countries are credited to the Core Funds. All restricted contributions, made by sponsors, governments, and non-governments sources, for specific projects are credited to Project Funds.

## Core Fund

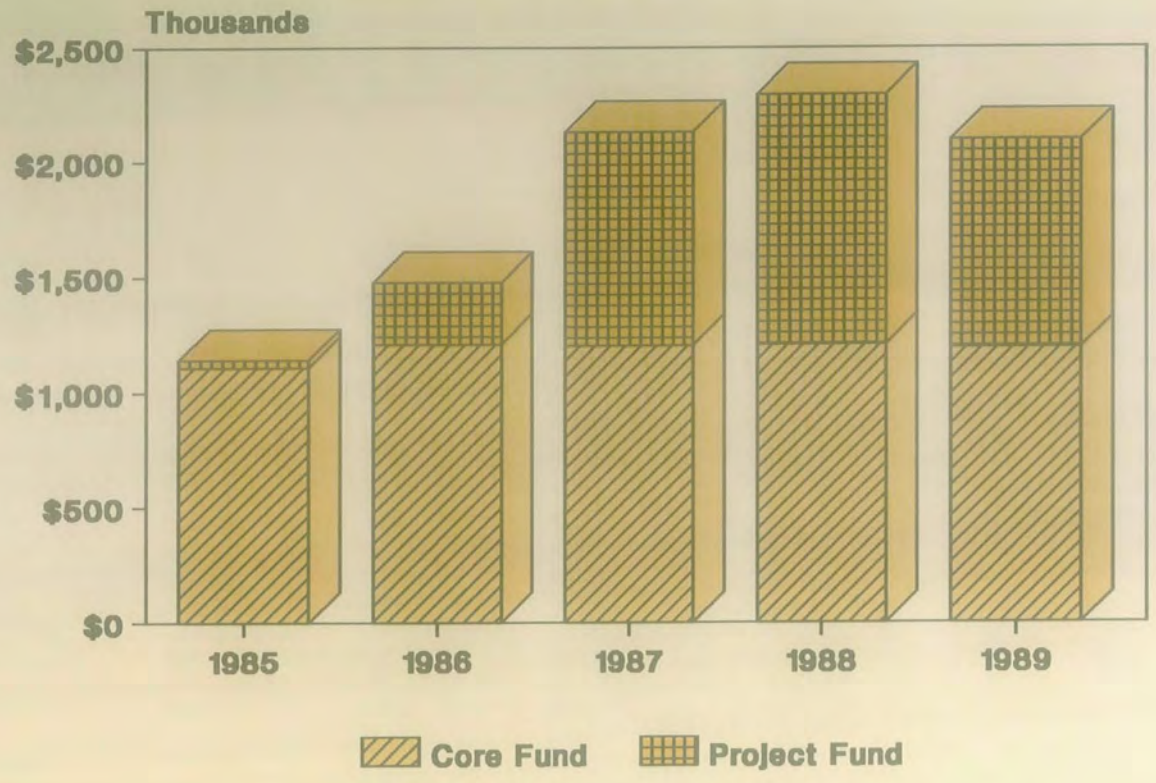
| Source of Fund | 1985 | 1986 | 1987 | 1988 | 1989 |
|---|---|---|---|---|---|
| His Majesty's Government, NEPAL | 29,504 | 24,243 | 24,028 | 39,841 | 17,523 |
| Federal Republic of GERMANY | 798,500 | 680,041 | 735,807 | 715,530 | 568,967 |
| Government of SWITZERLAND | 163,120 | 340,000 | 283,907 | 325,697 | 424,210 |
| People's Republic of CHINA | 20,000 | --- | 50,930 | -- | 19,158 |
| Government of INDIA | --- | 94,608 | --- | 80,319 | --- |
| Government of PAKISTAN | --- | --- | 5,820 | 26,766 | 23,771 |
| Royal Government of BHUTAN | --- | --- | 10,186 | --- | 5,895 |
| People's Republic of BANGLADESH | --- | --- | --- | --- | 9,614 |
| Sale of Assets | --- | --- | --- | --- | 22,280 |
| Other Income | 4,044 | 22,755 | 67,771 | 55,363 | 88,169 |
| Opening Balance | 93,175 | 47,048 | 23,879 | (38,684) | 12,276 |
| **TOTAL** | **1,108,343** | **1,208,695** | **1,202,328** | **1,204,832** | **1,191,863** |
| **EXPENDITURE** | **1985** | **1986** | **1987** | **1988** | **1989** |
| Programme Cost | 670,292 | 760,605 | 889,093 | 607,312 | 628,917 |
| Support Cost | 252,092 | 305,031 | 238,166 | 331,832 | 311,370 |
| Directorate Cost | 116,323 | 119,616 | 120,230 | 246,749 | 302,035 |
| Total Expenditure | 1,038,707 | 1,185,252 | 1,247,489 | 1,185,913 | 1,242,322 |
| Closing Balance | 69,636 | 23,443 | (45,161) | 18,919 | (50,459) |
| **TOTAL** | **1,108,343** | **1,208,695** | **1,202,328** | **1,204,832** | **1,119,863** |

## Project Fund

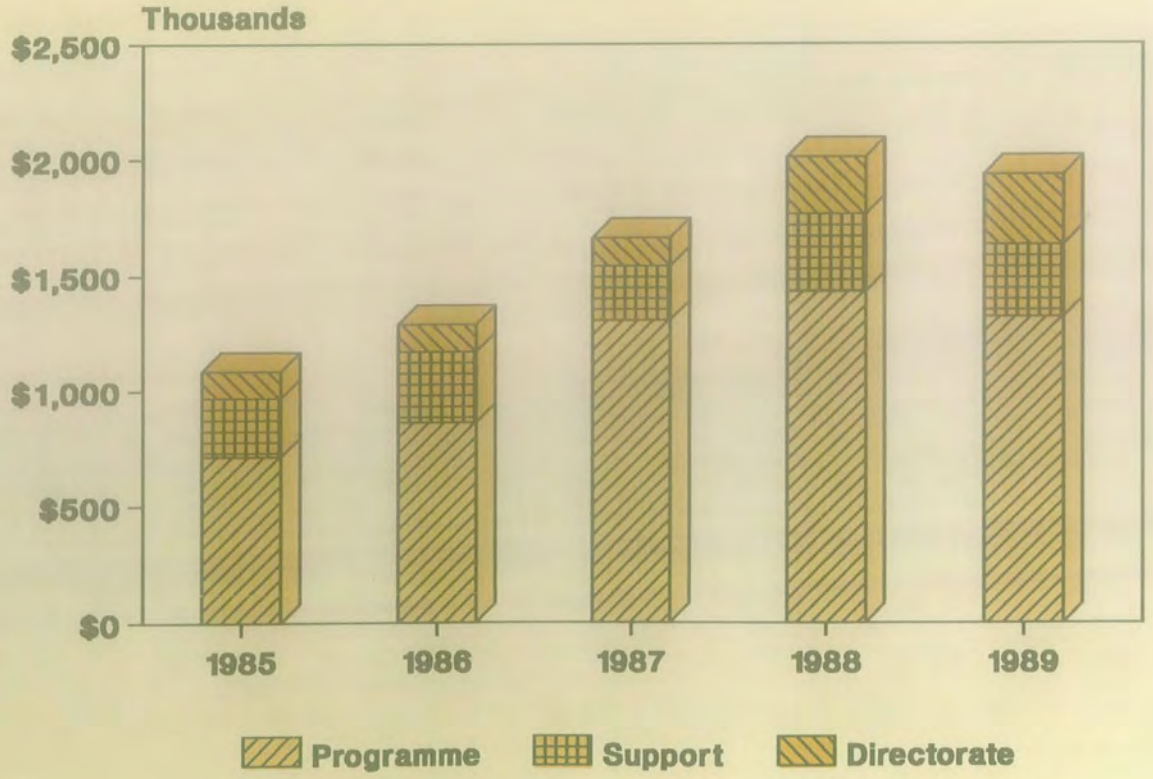
| Source of Fund | 1985 | 1986 | 1987 | 1988 | 1989 | Total |
|---|---|---|---|---|---|---|
| EEC | --- | --- | 154,974 | 188,384 | 135,765 | 479,123 |
| FORD | --- | 222,347 | 233,209 | 141,633 | --- | 597,189 |
| ADB | --- | --- | --- | 260,319 | 468,011 | 728,330 |
| IDRC | --- | 3,204 | 24,400 | 23,570 | 6,600 | 573,374 |
| FAO | 10,430 | 33,779 | 21,018 | 5,209 | --- | 70,436 |
| UNESCO | 14,643 | 16,092 | 3,300 | 21,397 | 194 | 55,626 |
| AKF | --- | --- | --- | 77,869 | --- | 77,869 |
| GTZ | --- | --- | 261,781 | --- | --- | 261,781 |
| OTHERS | 7,109 | 7,833 | 71,579 | 32,304 | 52,831 | 171,657 |
| Opening Balance | --- | (13,980) | 158,370 | 338,787 | 241,135 | 724,306 |
| **TOTAL** | **32,182** | **269,275** | **928,632** | **1,089,472** | **904,531** | **3,224,091** |
| **EXPENDITURE** | **1985** | **1986** | **1987** | **1988** | **1989** | **Total** |
| Total Expenditure | 48,285 | 104,026 | 415,687 | 823,611 | 691,712 | 2,083,321 |
| Closing Balance | (16,103) | 165,249 | 512,945 | 265,861 | 212,181 | 1,140,770 |
| **TOTAL** | **32,182** | **269,275** | **928,632** | **1,089,472** | **904,530** | **3,224,091** |

*Note: Opening and closing balances may vary because of the different exchange rates being used and adjustments for the closing projects.*

## Consolidated Annual Income




## Consolidated Annual Expenditure



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Price Waterhouse

## Auditors' Report to the Board of Governors of

## International Centre for Integrated Mountain Development

We have examined the accompanying financial statements of the International Centre for Integrated Mountain Development comprising Statement of Assets, Liabilities and Fund Balances as of 31st December 1989 and Operating Statement for the year ended that date, which have been signed by us under reference to this report. Our examination was made in accordance with generally accepted auditing standards, and accordingly, included such tests of accounting records and such other auditing procedures as we considered necessary in the circumstances.

The financial statements have been prepared on the basis of accounting policies described in Schedule 6 to the financial statements. On such basis, in our opinion, the financial statements give a true and fair view of the state of affairs of the Centre as at 31st December 1989 and the results of its operation for the year ended on that date.

Kathmandu
5th March, 1990

Price Waterhouse
CHARTERED ACCOUNTANTS

## Statement of Assets, Liabilities and Fund Balances
## As of 31st December, 1989

| Fund Balances | In Nepalese Rupees | US Dollar Comparative |
|---|---|---|
| General Fund: | | |
| Opening Balance | 349,857 | 12,276 |
| Deficit transferred from Operating Statement | (1,787,940) | (62,735) |
| Closing Balance (deficit) | (1,438,083) | (50,459) |
| Exchange Eqalisation Reserve Fund | 1,635,320 | 57,380 |
| Building Reserve Fund | 125,000 | 4,386 |
| Special Support Project Funds | | |
| Unspent Balances | 12,782,353 | 448,503 |
| Carried Forward Expenses | (6,054,178) | (212,427) |
| Net Balances | 6,728,175 | 236,076 |
| T O T A L | 7,050,412 | 247,383 |
| **Current Assets** | | |
| Cash in hand | 43,582 | 1,529 |
| Cash at Bank | | |
| Current Accounts | 1,360,348 | 47,732 |
| Time Deposits | 2,850,000 | 100,000 |
| Advances and Deposits | 1,639,184 | 57,515 |
| Core Fund Account Receivable | 3,023,057 | 106,072 |
| | 8,916,171 | 312,848 |
| **Less Current Liabilities and Provision** | | |
| Accounts Payable | 1,844,948 | 64,735 |
| Contribution for 1990 | 284,000 | 9,965 |
| Provision for Severance Pay | 399,664 | 14,023 |
| | 2,528,612 | 88,723 |
| Net Current Assets | 6,387,559 | 224,125 |
| Deferred Revenue Expenditure (To the extent not written off or adjusted) | 662,853 | 23,258 |
| T O T A L | 7,050,412 | 247,383 |

Chief Accountant

Chief Administrator

Director

This is the Statement of Assets, Liabilities and Fund Balances referred to in our Report of even date.

Kathmandu
5th March, 1990

Price Waterhouse
CHARTERED ACCOUNTANTS

## Operating Statement for the year ended 31st December, 1989

| | Schedule Reference | In Nepalese Rupees | US Dollar Comparative |
|---|---|---|---|
| **Income** | | | |
| Remittances from Donors | 1 | 30,470,431 | 1,069,138 |
| Other Income | 2 | 2,512,806 | 88,169 |
| Sale of Assets | | 634,973 | 22,280 |
| | | 33,618,210 | 1,179,587 |
| **Expenditure** | | | |
| Programme Cost | 3 | 17,910,584 | 628,442 |
| Support Cost | 4 | 8,874,043 | 311,370 |
| Directorate Cost | 5 | 8,607,991 | 302,035 |
| Deficit transferred from completed Projects (Net) | | 13,532 | 475 |
| | | 35,406,150 | 1,242,322 |
| Deficit for the year being excess of Expenditure over Income transferred to General Fund | | (1,787,940) | (62,735) |
| Significant Accounting Policies | 6 | | |
| Notes on Financial Statements | 7 | | |

Chief Accountant

Chief Administrator

Director

This is the Operating Statement referred to in our Report of even date.

Kathmandu
5th March 1990

Price Waterhouse
CHARTERED ACCOUNTANTS

# Abbreviations and Acronyms

| | |
|---|---|
| ADB | Agricultural Development Bank |
| ADB | Asian Development Bank |
| AKRSP | Aga Khan Rural Support Programme |
| CAS | Chinese Academy of Sciences |
| CDS/ISIS | Computerised Documentation System / Integrated Set for International System |
| CGIAR | Consultative Group on International Agricultural Research |
| CISNAR | Commission for Integrated Survey of Natural Resources |
| DMC | District Management Committee |
| ESCAP | Economic and Social Commission for Asia and the Pacific |
| EEC | European Economic Community |
| FAO | Food and Agriculture Organisation of the United Nations |
| GIS | Geographical Information System |
| GRID/GEMS | Global Resources Information Database / Global Environmental Monitoring System |
| HKH | Hindu Kush-Himalayas |
| ICIMOD | International Centre for Integrated Mountain Development |
| IDRC | International Development Research Centre |
| ILO | International Labour Organisation |
| ITDG | Intermediate Technology Development Group |
| IUCN | International Union for the Conservation of Nature and Natural Resources |
| MAB | Man and Biosphere |
| MENRIS | Mountain Environmental and Natural Resources Information System |
| MRE | Mountain Risk Engineering |
| NIUMOD | National Information Unit for Mountain Development |
| ODA | Overseas Development Administration |
| SALT | Sloping Agricultural Land Technology |
| TERI | Tata Energy Research Institute |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environmental Programme |
| UNESCO | United Nations Educational, Scientific, and Cultural Organisation |
| UNESCO/IHP | International Hydrological Programme |
| UNITAR | United Nations Institute for Training and Research |
| WCED | World Commission on Environment and Development |
| WWF | World Wildlife Fund |