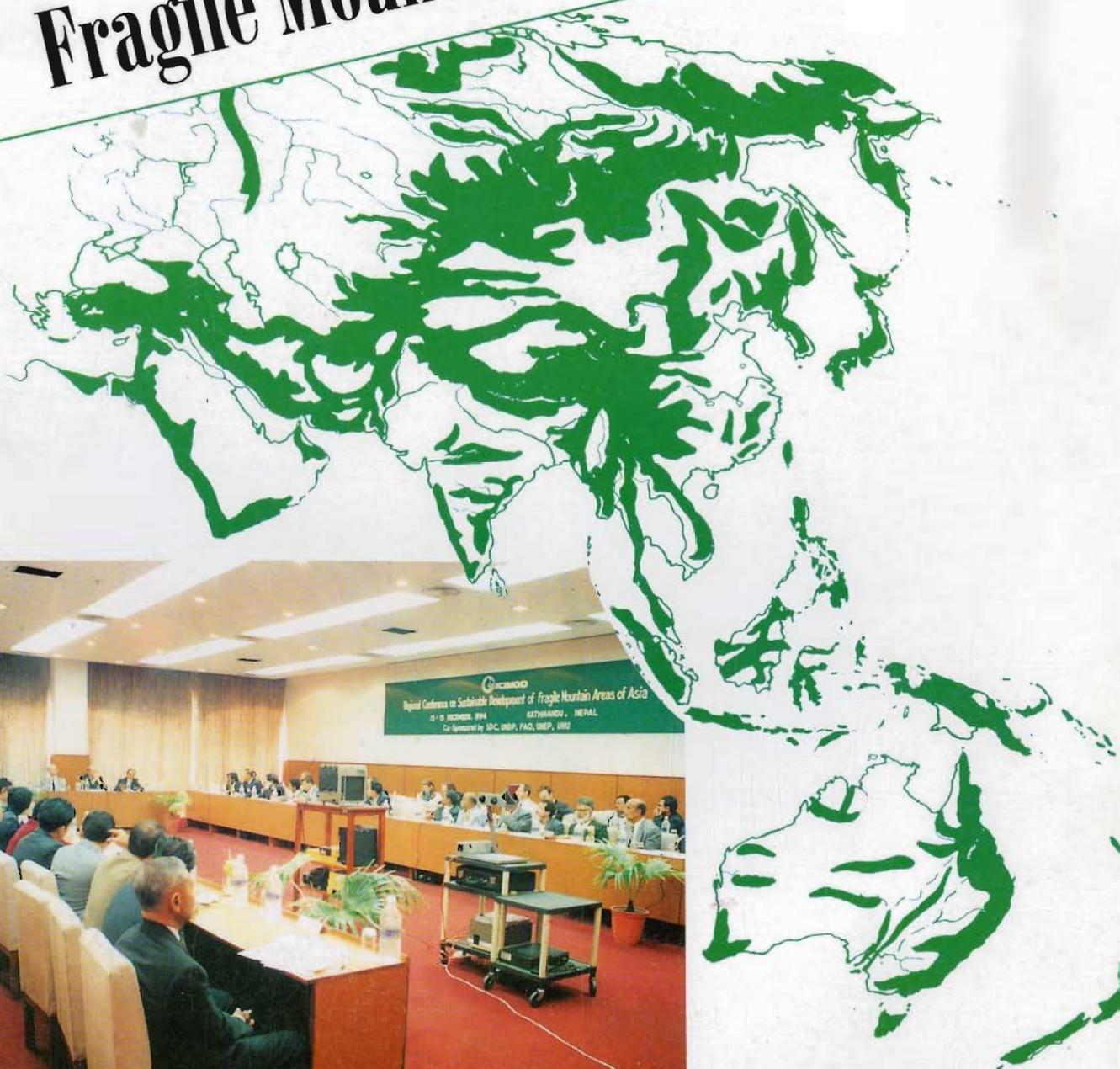


Sustainable Development of Fragile Mountain Areas of Asia



Edited by
Mahesh Banskota and Archana S. Karki

Regional Conference Report
13-15 December, 1994

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Edited by

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FOREWORD

Although ICIMOD's activities focus primarily on the Hindu Kush-Himalayas, the Centre's motto is to think globally and act regionally. It is this approach that motivated ICIMOD to accept the request of FAO (the UN focal point for Chapter 13 of Agenda 21) to organise this first-ever meeting on the mountain areas of Asia. The response from the Asian countries has been most enthusiastic and demonstrated a unanimous concern among the Asian countries regarding the deteriorating livelihoods of mountain people and the quality of their environments, in spite of the high variations among the mountain areas of Asia.

Mountain areas in many Asian countries represent extremely vital natural environments determining local climates, regulating downstream hydrology, providing biological diversity, and being a home for culturally rich and vibrant mountain communities. Unfortunately, development in mountain areas so far has not been friendly either to the mountain people or to their environment and this must change in a very fundamental way in the future.

The most significant achievement of the Conference, apart from the wide sharing of knowledge and experience in mountain development problems and opportunities, was the formulation of the Sustainable Development of Mountain Areas of Asia, or SUDEMAA, Call to Action recommendations. This in my opinion provides a timely beginning for all concerned to

overcome centuries of neglect, isolation, and marginalisation of mountain peoples and the mountain environment.

Chapter 13 of Agenda 21 has started the process for sustainable development of fragile mountain areas. This Conference has hopefully taken it a step further by calling on nations concerned to put mountain agenda higher up on their respective national development agendas. If ICIMOD can help promote this effort further, as requested by many of the participating countries, it is keen to help in any way it can.

I would like to express my sincere gratitude to the Rt. Honourable Prime Minister of Nepal, Mr. Man Mohan Adhikari, the Assistant Director General of FAO, Mr. A.Z.M. Obaidullah Khan, Ms. Savitri Kunadi, Vice-Chairperson of the UN Commission for Sustainable Development, the representatives of the participating countries, and the resource persons for their valuable contributions to the Regional Conference. I also thank the Swiss Development Cooperation, FAO, UNDP, UNEP, and the UNU for their valuable support to the Conference. Lastly, I would also like to express my sincere appreciation to Dr. Mahesh Banskota, the Coordinator of the Workshop, and to all the other ICIMOD staff who have put in long hours of hard work both before and after the Conference, including the publication of this Conference Report.

Egbert Pelinck
Director General

INTRODUCTION

Background

Table of Contents

Introduction	1
Setting the Scene: The Inauguration	3
Critical Issues: The Main Discussion	13
Looking Ahead with Agenda 21: Summary Country Statements	31
The SUDEMAA Call to Action	43
Field Visit to Dhaireni Rehabilitation Site, Kavrepalanchok District	47
Annex	49

INTRODUCTION

Background

In June 1992 the United Nations' Conference on Environment and Development (UNCED) adopted Agenda 21, of which Chapter 13 provides a special focus on mountain areas: "Managing Fragile Ecosystems: Sustainable Mountain Development." In this chapter mountain areas are seen as fragile ecosystems urgently in need of major efforts to promote sustainable development. Two programme areas were identified under Chapter 13. The first one was to generate and strengthen knowledge about the ecology and sustainable development of mountain ecosystems and the second one was to promote integrated watershed development and alternative livelihood opportunities to mountain people throughout the world.

In order to facilitate the translation of the concerns and issues expressed in Chapter 13 (of Agenda 21) into a realistic programme for action, it is essential that a number of activities be initiated on a priority basis. These include (a) overcoming the lack of knowledge of mountain ecosystems through various measures, (b) establishing and operationalising an effective communication network for information exchange, and (c) implementing collaborative activities that address both the problems of and the opportunities for sustainable mountain development.

ICIMOD was established in 1983 with a major mandate in information exchange, research, and training in the Hindu Kush-Himalayas. It played a pioneering role, along with others, in the preparation of Chapter 13 and will continue to facilitate the implementation of the concerns of Chapter 13 in Agenda 21.

It has generally been agreed that a special effort is needed to move the 'Mountain Agenda' higher on the international and national development agendas. Having an exclusive mandate for integrated mountain development, ICIMOD decided to take the momentum generated by the Earth Summit in 1992 a step further by organising this first "Regional Conference on Sustainable Development of the Fragile Mountain Areas of Asia".

Objectives

The main objectives of this conference were to draw the attention of development planners, natural resource managers, and the international donor community to the increasing problems of mountain areas in Asia; to facilitate reviews and assessment of the knowledge already available throughout the region; to identify gaps in our knowledge and identify emerging issues in mountain development that require priority attention for scientific and analytical work; and to provide an opportunity for the donor community to communicate directly with key institutions and individuals on priority needs for external assistance specifically designed for sustainable mountain development.

It was hoped that the conference would achieve:

- ▶ a better understanding of major issues affecting sustainable mountain development in Asia -
-

both with regard to their problems and the opportunities that mountains provide for development;

- ▶ a set of recommendations for accelerated action in poverty alleviation and environmental management in mountain areas; and
- ▶ a plan of action for Regional and Subregional Collaboration in Sustainable Mountain Development.

Programme and Participation

The three-day Conference was held in the Convention Hall in Kathmandu from December 13 to 15. The welcome remarks were given by the Director General of ICIMOD and Ms Savitri Kunadi, Vice-Chairperson of the UN Commission for Sustainable Development, delivered the opening address. Mr. A.Z.M. Obaidullah Khan, Assistant Director General of FAO, gave the keynote address after which the Rt. Honourable Prime Minister of Nepal inaugurated the Conference and delivered the Inaugural Address. The highlights of these addresses are given in Chapter 2 and a detailed programme schedule in Annex 1.

The Conference brought together over 60 policy-makers and practitioners committed to mountain development. Seventeen governments of Asia sent two delegates each, one from the planning sector and one from the national resources' sector. The participation of representatives from over 10 international organisations, bilateral and multilateral donor organisations, and non-governmental organisations reflects the interest and potential for greater attention to mountain development among these organisations also. The list of participants is provided in Annex 2. During the two days of discussions, theme papers were presented on a number of issues critical to the improvement of the economic and environmental conditions in the mountain areas of Asia, focussing on:

- ▶ restoring the environment and combating poverty,
- ▶ sustainable mountain farming systems,
- ▶ management of rangelands and grasslands and control of desertification,
- ▶ management of mountain watersheds and forest resources,
- ▶ sustainable use and conservation of biodiversity,
- ▶ natural hazards and disaster management,
- ▶ women and mountain development, and
- ▶ review of selected mountain development processes and opportunities.

Highlights of these papers and the discussions that followed are presented in Chapter 3.

On the final day, delegates, representing mountain regions from New Zealand to Iran, presented summary country statements under a session headed 'The Asian Mountain Agenda: Looking Ahead with Chapter 13'. Their major highlights are discussed in Chapter 4.

The final session on 15th December concluded with the participants formulating the SUDEMAA (Sustainable Development of the Mountain Areas of Asia) Call to Action based on the crucial concerns generated by the Conference. This is presented in its entirety in Chapter 5. The day after the Conference, on 16th December, many participants visited an ICIMOD site for rehabilitation of degraded lands in Kavre District, east of Kathmandu, where discussions took place with villagers and local officials.

Welcome Address

Setting the Scene The Inauguration

Welcome Address - Egbert Pelinck Keynote Address - A.Z.M. Obaidullah Khan

Opening Address - Savitri Kunadi Inaugural Address - Manmohan Adhikari



Welcome Address



*Mr. Egbert Polinch
Director General
ICIMOD*

I am delighted to welcome this distinguished gathering to the first 'Regional Conference on Sustainable Development of Fragile Mountain Areas of Asia'.

Asia has the largest, highest, and the most populated mountain systems in the world. More than two hundred million people live in the mountains and upland areas and another one billion people downstream are directly affected by the conditions of these mountain environments. Their uniqueness is also evident in other respects.

Ecologically, these are nature's banks for biodiversity and genetic resources. Environmentally, they are among the most fragile ecosystems in the world, extremely sensitive to scale and type of economic interventions. Culturally, these mountain areas are among the last repositories of rich and diverse ethnic traditions and practices in a world that is rapidly embracing a monoculture of industrialisation and urbanisation. And economically, the challenge of poverty alleviation for the men, women, and children in Asia's mountains is among the most serious in the world, in spite of the fact that large amounts of different resources are extracted from these very mountain areas for the benefit of lowland irrigation and industrialisation.

The physical isolation of the mountain areas in the past has caused their exclusion from mainstream development, resulting in continuing political and economic marginality. The transition from the fringe towards the mainstream can only be brought about through a systematic build up of useful knowledge and its applications and the development of mountain-specific policies, skills, and technologies, including a substantial strengthening of institutional capacities at various levels.

This Regional Conference is being organised as a follow up activity to one of the concerns of the Earth Summit which was held in 1992 in Rio de Janeiro: a concern for fragile mountain ecosystems, as described in Chapter 13 of Agenda 21. There has been a growing anxiety that the momentum generated at the Earth Summit is not being adequately sustained, but this conference will, I hope, take it one step further, and ICIMOD is proud that it was asked by the UN to organise the first regional conference on

Chapter 13 of Agenda 21 in time for the next session of the Commission for Sustainable Development, which will review the progress made in implementing Agenda 21 at its next session in April.

The conference will focus, during two days of discussions, on different aspects of mountain development, and the third day is to be devoted to country statements on country-specific mountain issues and will make recommendations for accelerated action for poverty alleviation and environmental management at national level. Proposals for regional and subregional cooperation in support of national actions are also expected.

In order to demonstrate our concern for the mountain people in Asia, I would suggest that over the next three days we ask ourselves the following questions.

Firstly: How can sustainable development of mountain areas of Asia receive more attention at political and policy levels and be fully integrated in national development plans?

Secondly: In what way and in which fields should local, national, regional, and international institutions with a mandate for sustainable mountain development be strengthened?

Thirdly: How can networking and partnerships, so essential for information flow and cooperation, be established or strengthened?

Fourthly: What would be the justification for governments, NGOs, and donors allocating more financial resources to sustainable mountain development?

Lastly, and probably most important: How can the concerns and commitments to mountain development be translated into field-level action of direct benefit to the people of mountain areas?

I hope you will give some thoughts to these interlinking issues in addition to the specific scientific subjects that you will discuss. I sincerely hope that we have a very fruitful meeting during the next three days. We owe it to the future of the diverse peoples and the rich natural and cultural environments of the mountains of Asia.

Thankyou.

Opening Address



Ms. Savitri Kunadi
Vice-Chairperson
Commission for Sustainable
Development (CSD)

It is indeed a great honour for me that I, as the representative of the Bureau of the Commission on Sustainable Development, have come to participate in your conference. Dr. Klaus Topfer, the Chairman of the Commission, had desired to personally attend the conference but was unfortunately unable to do so. He has asked me to convey to you his warmest greetings and best wishes for useful and productive deliberations at this Regional Conference. The Commission on Sustainable Development was established as a functional commission of the Economic and Social Council of the United Nations in 1993 to effectively monitor the implementation of Agenda 21, solemnly adopted by one of the largest gatherings of world leaders ever seen at the UN Conference on Environment and Development held in Rio de Janeiro in June 1992. It has already held two annual sessions and the next session will focus on the issues of land, desertification, forests, and biodiversity. The Commission has acknowledged the valuable

contributions made to its deliberations as well as to the practical implementation of Agenda 21 by Non-Governmental Organisations and other major groups. The process of environmental protection and promotion being of necessity a continuous one, the Commission believes that intersessional activities, whether conducted by Governments, regional or even Non-Governmental Organisations are of crucial importance. In this sense, we are happy at the initiatives taken by ICIMOD and would look forward with a great deal of interest to the outcome of your deliberations over the next three days.

The United Nations' Conference on Environment and Development brought the issues of Environment and Development, which had first begun to gather attention at the 1972 Stockholm Conference on the Human Environment, to the centre of the attention of the international community. It established the importance of sustainable development which envelopes the two concepts of development and environmental protection. It also forged the foundations of a global partnership for environmental protection based on the fact that the environment of the entire world was common. Both the developed and developing countries have a responsible role to play in ensuring sustainable development.

Much of the environmental degradation was due to either the unsustainable lifestyles of the industrialised world or due to poverty and underdevelopment which themselves result from inequitable growth patterns. However, consumption of natural resources by the poor cannot be confused with the unbridled consumption of certain countries. The historical and colonial legacy of pollution cannot be ignored and the development of the people has to be kept at the centre of our attention and activities.

Adoption of the Rio Declaration on Environment and Development embodying 27 principles which are meant to govern environmental and economic behaviour of peoples and nations was one of the great achievements of the international community. The right to development was recognised and the essentiality of eradicating poverty stressed.

Chapter 13 of Agenda 21 focusses on the 'Management of Fragile Ecosystems: Sustainable Mountain Development'. It recognises that, as a major ecosystem representing the complex and interrelated ecology of our planet, mountain environments are essential to the survival of the global ecosystems. Mountains are, however highly vulnerable to human and natural ecological imbalance. The work of ICIMOD in this direction has received the accolades of the international community. It is important that ICIMOD now attempts to create a mountain perspective in the international community as we move towards the Third Session of the Commission on Sustainable Development. The Third Session of the CSD would be focussing, as I said earlier, on the issues of land, desertification, forests, and biodiversity.

The role of ICIMOD in generating and strengthening the knowledge about ecology and sustainable development of mountain ecosystems has been recognised in Agenda 21, which calls on the national governments and international organisations to support it.

Even when the CSD considers the issue of forests or desertification, the mountains, as one of the richest forest cover areas and as an important source of water, can be ignored only at our peril. I would request ICIMOD to sensitise the international community towards this complex interlinkage between the activities in the plains which may be beneficial for the sustainable development of mountains, the effects of conservation of the mountain ecosystem on the plains and indeed the global environment, and similarly how the adverse activities of one have substantial and significant detrimental effects on the other. It is to this task that ICIMOD must devote itself in the coming months.

Development of the mountains has to be viewed in a holistic manner, encompassing economic development, technological improvement, environmental protection, and human resource development. All these activities are complexly interrelated and gains in one will produce benefits in others.

I hope that your deliberations and the efforts of ICIMOD will be supported by the international community and prove beneficial to mankind.

I wish you all success.

Thankyou.

Keynote Address



*Mr. A.Z.M. Obaidullah Khan
Asst. Director General
FAO*

I am grateful to Mr. Pelinck for giving me the privilege of addressing this distinguished audience of committed scholars and compassionate intellectuals. May I convey to you warm greetings from the Director General of FAO, Dr. Jacques Diouf.

On 14 April, 1994, in Kathmandu, at the Workshop on Indigenous Systems and Biodiversity Management, Mr. Pelinck, in his inaugural address, concluded that the challenge now being faced was how to build upon indigenous knowledge when responding to the rightful aspirations of the mountain people who, until today, have been excluded from making choices about their own lives and destiny. Confronting and surmounting this challenge represents a significant step in transforming what I hope is our mutual dream into a reality.

With respect to the sustainable development of fragile mountain areas we are expected to produce the following results. One, a better understanding of major issues affecting sustainable mountain development in Asia. Two, a set of recommendations towards accelerated action in poverty alleviation and environmental management in mountainous areas, and three, a plan of action for regional and subregional collaboration in sustainable mountain development.

Even beginning to generate these results is a tall order, but we have been charged with the responsibility of framing a plan of action to translate the July 1992 Agenda 21 into action, and, more particularly, with the responsibility of concentrating on Chapter 13 which focusses upon two broad areas: first, to generate and strengthen knowledge about the ecology and sustainable development of mountain ecosystems and second, to promote integrated watershed development and alternative livelihood opportunities to mountain people throughout the world.

Honoured guests, I seek results which will be taken to the people as a humble submission, which they can totally veto, totally accept, partially veto, or partially accept. I want our results to serve as a menu for the mountain people which they can spice to their own taste or which they can declare inedible and unacceptable.

Our results will not be bound like some holy book, but rather carried to the people in a looseleaf binder with no pride of authorship and with the full knowledge that the fragile mountain areas require dynamic initiative. We need some very specific results, but we need to face the concerns the indigenous people themselves have chosen to be their priority

concerns and use science and modern techniques, after we have inventoried the indigenous knowledge base, to evolve the appropriate set of information to answer the questions the people have confirmed they want answered.

To catalyse our three-day effort, let me articulate some of my opinions and biases. First, both domestic and international financial resources are extremely tight, which means that we need to concentrate more than ever on financially viable initiatives that reward and inspire the people, that restore the ecosystem, and that impose a very heavy penalty on environmentally-unsustainable activities. Second, investment in primary and secondary education, particularly of women, is a must, and I recognise that education is not the purview of the FAO; but without access to education, the marginalised communities will continue to be excluded from decisions that affect their lives. Third, I appreciate the singling out of Women and Mountain Development as one of our eight topics, but women, who hold up half the sky must be integrated into every one of our eight topics. This is a rather dangerous idea for me to bring up; so I will do this on an off the record basis and in my personal capacity. Would it not be feasible to draft and frame the concluding country statements in a manner that describes the role of the female, the role of the male, and the roles they should both play? Fourth, malnutrition and disease take a savage toll in upland communities -- often two or three days' trek from the nearest doctor. Protein deficiency is common as wild game and domestic livestock get scarce. Yearly, thousands of these ethnic clusters die from lack of safe drinking water. Death through shrivelling away is not the stuff of headlines. But disease constitutes a form of ethnic cleaning in the uplands as brutal and deadly as the ethnic cleansing in Yugoslavia.

We must be aware of mountain specificities which, according to Dr. Jodha, are inaccessibility, fragility, marginality, diversity, niche, and human adaptation mechanisms. Another overriding consideration is the alternative livelihood opportunities to mountain people; these people need to have access to resources and unsubsidised incentives to formulate initiatives which will create off-farm employment opportunities generating income and surplus capital for the mountain regions.

The key ingredient for economic growth, particularly off-farm economic growth, is access to both sustainable credit and a sustainable pool of investment. Thus, a critical recommendation that I would suggest should emerge from our deliberations is a call on the local banking systems to design financially viable credit for the fragile mountain ecosystems. Let me mention two sectors that would appear to have immediate financial potential: tourism and honey.

Distinguished friends, as we brace ourselves for three productive days, please remember our vow of humility and the sound reasons for that. We must produce some results that can be field-tested and results which have a sustainable economic rationale. We may indeed spawn a report which will be admired by our headquarters or capital cities. Such results are fine only if they have the potential of improving the natural and human conditions of the fragile mountain ecosystems.

Thankyou.

Inaugural Address



*Mr. Manmohan Adhikari
Rt. Hon'ble Prime Minister
Nepal*

I have the great honour and privilege to address this distinguished gathering. I would like to extend my heartfelt welcome to all the participants in this very important 'Regional Conference on Sustainable Development of Fragile Mountain Areas of Asia'.

Sustainable development has become a critical concept for our future. Humanity is at a very important crossroad as it prepares to enter the next century. Changes in science and technology, industrialisation, and urbanisation have been most rapid during this century. These changes are influencing every part of the globe and even the relatively isolated mountain areas. However, in many instances, not everybody has benefitted from these developments which have also been accompanied by increasing pollution and loss of natural resources, reduced biodiversity, and growing social tensions. With rapid growth of population and relatively weak economies, the challenge of sustainable development in mountain areas appears to be formidable.

Mountain people have in the past been able to cope with the harsh mountain conditions through hard work and intimate knowledge of their environment. However, the aspirations of the present and future generations can no longer be met through traditional lifestyles exclusively dependent on natural resources that are decreasing day by day.

Some mountain areas have performed reasonably well in not only improving their economies, but also in preserving their environment, biodiversity, and cultural heritage. It is absolutely essential that we learn from these successes, which often are based on the advantages that mountain areas have compared to the plains. But we are also together to learn from the failures of the past.

I urge the distinguished participants to review success and failures and to come up with workable solutions to sustainable development, in technologies, in policies, and in institutions.

Nepal is mainly a mountainous country and therefore improving the living conditions of the mountain people and mountain environment has been an important part of our development strategy. While we are making progress in some areas, in others we are eager to learn about the experiences of other countries in terms of how policies and programmes have been made more appropriate to mountain conditions. We would like to learn more about different types of poverty-reducing programmes, including those that have improved the conditions of women and children.

Without the participation of the people, very little protection of environmental resources is feasible and the experience of Nepal in community forestry and other types of participatory natural resources' management is hopefully of interest to other countries when identifying promising approaches for sustainable mountain development.

There is also a major role of the private sector in helping to reduce poverty and protect the environment through generation of investment and employment. There is a wide range of experience in Asia regarding development approaches and the efforts being made to mitigate different types of environmental problems. We should systematically learn from this rich experience. I look forward to your analyses, conclusions, and recommendations in this respect.

I must place on record my sincere thanks to the International Centre for Integrated Mountain Development (ICIMOD), located in Nepal, for inviting me and taking the initiative to organise this Regional Conference. Organisations like ICIMOD that are focussed on the Sustainable Development of Mountain Areas need much stronger support than in the past. I would also like to thank all the other organisations that have provided support for this Regional Conference. I thank all of you for your interest and participation in this important Regional Conference.

Ladies and Gentlemen, may I wish you a most successful deliberation. I sincerely hope your efforts will further the cause of mountain people and mountain environments throughout Asia. Lastly, I would also recommend that you take time off to see for yourself the mountain people and mountain areas of Nepal.

Thankyou.



Critical Issues

The Main Discussion

- Session I: Sustainable Development of Mountain Areas:
Restoring the Environment and Combating Poverty
- Session II: Sustainable Mountain Farming Systems
- Session III: Rangelands and Grasslands and Control
of Desertification
- Session IV: Management of Mountain Watersheds and
Forest Resources
- Session V: Sustainable Use and Conservation of
Biodiversity
- Session VI: Natural Hazards and Disaster Management
- Session VII: Women and Mountain Development
- Session VIII: Review of Selected Mountain Development
Processes and Opportunities

Session I: Sustainable Development of Mountain Areas: Restoring the Environment and Combating Poverty

Dr. M. Banskota, ICIMOD

If there is any ecosystem that is most severely threatened by the challenges of economic, environmental, and cultural survival, it must be the mountain areas. Despite the large differences in the biophysical and sociocultural environments of mountain areas, the rampant poverty and the difficulties encountered in its reduction appear to be common ailments afflicting almost all mountain societies. Whether it is in the arid mountains of West and Central Asia or the cold mountain areas of Russia, the Hindu Kush-Himalayas or the uplands of South East Asia and the Pacific, mountain people seem to be not only relatively worse off than their respective plains' inhabitants, but also, in most cases, development forces have either bypassed them or have not succeeded in making their living conditions less difficult. The exceptions are few.

Mountain farmers are having to eke out a living for their increasing numbers from small plots of sloping agricultural lands that are losing soil fertility and valuable topsoil. The burden on their womenfolk and children to manage the difficult agricultural work has increased as able-bodied male members are forced to search for incomes outside their farms and villages. The story with mountain pastoral groups is not very dissimilar as degrading pastures and ranges also reduce traditional sources of food supply. Upland people practising various types of shifting cultivation are also reducing traditionally-maintained fallow periods and are clearing more forest lands to compensate for losses in food supply. Forests throughout the warmer mountain areas have been a major safety valve so far, but these are also coming under relentless pressure from both mountain dwellers and lowlanders. Unfortunately, development forces have been highly insensitive to mountain conditions and have also contributed to these problems, often guided by priorities different from those directly benefiting mountain people and mountain environments.

Barring a few exceptions, environmental problems such as increasing loss of topsoil, deforestation, water shortages, flash floods, and degradation of large tracts of agriculture, forest, and pasture lands have increased over the years in almost all the mountain areas of Asia. While it is well known that natural hazards are common in mountain areas, population pressure, poverty, and development activities are forcing people to move into high risk zones, increasing their vulnerability to many of these naturally-occurring events.

The stagnant nature of mountain farming systems has been one of the major causes of poverty. A major challenge for reducing both poverty and pressures on the environment is therefore to transform a stagnating mountain agriculture into a dynamic one by systematically identifying and developing comparative advantages in different agro-climatic belts on a sustainable basis. There is scope for increased productivity in the agricultural sector, but there is little scope for increasing the area cultivated. Prospects for productively employing the rapidly increasing population in traditional agricultural activities are not encouraging. This is the stark background against which the importance of generating off-farm employment emerges so clearly, and even here the prospects appear to be very difficult.

At present, there is no escaping the fact that a rapidly growing population in many mountain areas is exerting pressures on available natural resources; pressures that exceed the physical carrying capacity and the scale of the economy. This is equally true for ranges, grasslands, mixed farming areas, and those under shifting cultivation. While physical carrying capacity is subject to change through technological improvements and investments in real capital, these "gains" from technology and capital formation in mountain areas have been far too limited in magnitude and extent to offset the pressures of a rapidly

growing population. The scale aspects of increasing population-related pressures are already very serious and given present trends will continue to worsen in the future.

Marginality of mountain areas is most evident from the inadequate development attention received by most mountain areas. In the national competition for development resources, mountain areas have been relatively unsuccessful. It is this factor that explains the slow development of basic infrastructure and support services. A major factor that has guided mountain development activities in the past has been the extent to which mountain resources could be exploited for use in the plains.

Limited development efforts in mountain areas have had little impact on poverty and worsened the environmental conditions in many areas because of weak institutions. If there has been a failure to mobilise local community organisations, wherever these have existed, the expansion in central development bureaucracies has also been limited and performing poorly. Stronger local-level development organisations are indispensable for successful management of development activities in view of the various constraints of access and communications. Decentralised and participatory organisational frameworks have been accepted as needed, but efforts to promote these have not been sustained.

Sustainable development approaches must provide a realistic basis for guiding action at different levels of decision-making, without being so costly that the approach becomes unaffordable. This approach will not differ from the past, if substantially more attention is not given to improving the livelihoods of the poor through low-cost, high-yielding, locally-sustainable, people-based solutions to the problems of poverty and resource degradation. Many of the serious problems concerning resource degradation, population growth, and inadequate living standards persist or worsen, not because they are impossible to solve but because they have not yet received the attention needed. The three important natural resources for villages are land, water, and forests. The continuing degradation of these resources has adversely affected food security, the economic conditions of the village, and the biodiversity of the environment. It is, therefore, very essential that village communities are supported to undertake activities for protection, conservation, and improved management of these natural resources.

Studies have shown the need for strong policies on both the demand and supply side. Demand management plays a crucial role in the short- and medium-term in reducing the pressures on resources, while supply management has an important role in the medium- and longer-term perspective. Macro-policies must emphasise both of these aspects in order to ensure that the mountain areas begin to move towards a path of sustainable development.

Discussion

The important issues raised in the context of sustainable mountain development are integration of mountains with the plains, a better understanding of the impact of development programmes on mountain areas, greater sensitivity to mountain conditions, resolving the conflicts of increasing production while maintaining sustainability, and assessing the impact of commercialisation on mountain societies and economies, particularly in terms of greater exploitation of scarce and fragile mountain resources. It was also observed that while the scale aspects of population could not be ignored, more efforts should be directed towards improving and diversifying mountain economic activities on a sustainable basis. Change in mountain areas is inevitable. However, consideration must be given to the type of change most appropriate for different mountain areas. While being sensitive to the diversity of the mountains, there are also important lessons to be learned from common problems. Development institutions need to be far more sensitive to these issues, including the need to ensure that women are not marginalised.

Session II: Sustainable Mountain Farming Systems

The majority of the mountain people continue to depend on farming for their livelihood, and it is very critical to ensure that mountain farming systems are sustainable. Numerous factors have resulted in increasing pressure on farm and environmental resources leading to declining productivity, increasing soil erosion, and loss of natural resources, making it extremely difficult for farm households to meet their growing demands. The challenge of different farming systems throughout the mountain areas is to make them economically viable and environmentally sound. Sustainable options available for different types of farming systems found in the mountain areas need to be carefully examined.

Soil Erosion and Soil Fertility Management - Dr. K. Syers, IBSRAM, Thailand

Different types of physical factors (compaction and crusting, water logging, and soil erosion), chemical factors (nutrient depletion, salinisation, acidification, and pollution), and human-induced factors (deforestation, overgrazing, and over-exploitation) play an important role in soil degradation, depending on the nature of the area. The major cause of unsustainability on steep lands is water runoff and consequent erosion. Such steep slopes occupy a very large area in Asia (35% in Thailand, 63% in the Philippines, 75% in Vietnam, and 87% in Nepal) and are classified as hilly and mountainous areas.

Experiments carried out in different areas using conservation farming practices have indicated that soil loss can be reduced and, in some cases, quite substantially, but the appropriate mix of practices and their impact varied considerably from location to location. Experiments on 20-50 per cent sloping lands in Chiang Rai, Thailand, showed very substantial soil loss reduction when using grass strip and hillside ditches, but little change with agroforestry as compared to farmers' practices. Similar experiments conducted in Chiang Mai on land with 18-40 per cent slopes showed alley cropping to be as effective as grass strips and hillside ditches. Insofar as the role of contour hedgerows in soil erosion control and soil fertility management in sloping areas is concerned, they reduced soil loss and often increased crop yields in the short-term. They also supplied mulch and nutrients and fodder for ruminants. However, there was competition for light, water, and nutrients, and it could accentuate pest and disease problems. Farmers also had difficulties in adhering to this practice on a continued basis. Other practices such as clean weeding with herbicide, legume and grass ground cover, minimum tillage, and hedgerows with clippings' mulch, were also found to reduce soil loss. One of the most important findings has been the critical role of providing additional nutrient inputs in order to make sloping land farming systems sustainable in the long run.

While many issues need to be examined through more systematic and continuing research, several points need to be emphasised regarding soil erosion and soil fertility management in sloping and mountainous areas. In many situations, soil loss can be reduced to acceptable levels and a range of technologies is available. Management of the vegetative cover (living and dead) is critical. External nutrient input is essential to balance losses in runoff, by soil erosion and by crop off take for a system to be sustainable. The potential for and benefits of hedgerows require a more careful evaluation than has been accorded in the past.

Dry Land Agriculture - Dr. M. Saxena, ICARDA, Syria

Large areas of West Asia's uplands can be classified as arid and semi-arid areas consisting of ranges and grasslands with a mix of nomadic transhumance, sedentary, and semi-sedentary agricultural and livestock activities. About 38 per cent of the total population in this region depend on these ranges and grasslands,

where the average rainfall is about 200mm per annum and agricultural activities can be executed for only about 120 days in a year. Livestock raising is the dominant activity with 70 per cent of the sheep, 50 per cent of the cattle, and the bulk of camels depending on these rangelands for natural grazing. Severe degradation of these ranges and grasslands has become a serious problem. Increasing loss of vegetation and soil resources are among the major problems arising out of overgrazing, abolition of tribal control over rangelands, and inadequate attention to the protection and sustainable use of range resources. Efforts are also underway to permanently settle nomadic groups, greatly disrupting traditional lifestyles and resource management practices.

Measures to develop these arid areas have focussed on enhancing biomass output through the use of appropriate drought and cold-tolerant species of animal legumes, bushes, and agricultural crops, including reseedling of natural vegetation. Efforts have also been made to increase the levels of nitrogen and phosphate in the soil and reintroduce rotational grazing. As water is a critical constraint in these areas, more efficient local and improved methods of water harvesting have been emphasised.

The sustainable development of dryland agriculture and animal husbandry requires better integration of pasture activities with arable farming, improving soil fertility, more efficient rotational grazing systems, better utilisation of scarce water resources, improving agronomic practices, and reducing population and livestock pressures. In this context, integration of traditional practices, such as regulating herd size based on feed condition, is as essential as the management of modern changes such as improved transportation which by providing greater access to range resources has resulted in greater degradation in the absence of proper management systems.

Shifting Cultivation - Dr. K. Rerkasem, Chiang Mai University, Thailand

Shifting cultivation has been an important feature of the upland areas of East Asia covering parts of Myanmar, Thailand, Vietnam, South China, and the Philippines. Farmers practising shifting cultivation have developed complex and integrated systems to exploit available agricultural and forest resources in their respective environments. These systems, with some common characteristics, have been undergoing substantial changes. Most of the shifting cultivators consist of ethnic minorities. Along with increase in population pressure, deforestation has also been rapid. Traditionally-maintained fallow periods for restoring soil fertility in shifting cultivation has declined in all the countries. Most governments are attempting to permanently settle shifting cultivators through the introduction of paddy cultivation, cash crops, and other development activities. Stronger measures are being introduced to conserve and protect forest resources traditionally used by these people.

The effects of these changes have been both positive and negative. Increasing population pressure has intensified land use. Paddy is being cultivated wherever slopes and water conditions are favourable. The most significant change has been the improvement in infrastructure accompanied by development in multiple cropping and production of cash crops for non-local markets. The economic incentives for increasing commercialisation have been fairly large.

The sustainable development of shifting cultivation in warmer and wetter upland areas of East Asia requires a better integration of traditional activities with modern commercial cash crops. Better understanding is needed regarding why some of these farmers have stronger conservation practices than others. Insofar as specific areas of emphasis are concerned, diversification of livelihood activities, integration of traditional and new technologies, community management of natural resources, and better harnessing of water resources deserve higher priority.

Session III: Rangelands and Grasslands and Control of Desertification

Ranges, pastures, and grasslands cover a substantial area in the mountain areas of Asia and there are still a sizeable group of people dependent on these resources for their livelihood. As ranges and pastures are also on the borderline with many deserts, their degradation enhances the onset of desertification. The neglect of rangelands has been even greater than mountain agriculture. Major efforts are needed to understand the changes being encountered in these critical resources for their successful rehabilitation and controlling the expansion of deserts in these areas. An essential component of any successful strategy in this context is to understand the traditional adaptation mechanisms of the people inhabiting these areas and to build on their efforts.

Rehabilitation of Degraded Ranges and Pastures - Dr. N. Mohammed, PARC, Pakistan

Mountain areas of Asia and the Pacific region have a wide variety of rangelands representing almost all major grassland ecosystems of the world. From a rangeland management point of view, Australia, China, Mongolia, the Islamic Republic of Iran, India, Pakistan, and Afghanistan are very important. Apart from Australia and New Zealand, most of the countries in the region have traditional livestock grazing patterns and practices, and scientific management is rarely practised.

Most of the rangelands in the region are located in the arid and semi-arid areas, supporting sparse vegetation cover with a low-carrying capacity. The productivity of grasslands within the reach of monsoon rainfall is high. However, many grazing areas are gradually being replaced by crop cultivation, exerting extra pressure on the already exhausted and degraded range resources. In addition to permanent pastures, livestock graze in forests, on marginal lands, and in many other areas. Technology is available to increase the productivity of rangelands in the region, thereby enhancing the availability of animal protein for the ever-increasing human population.

The issue of range development covers a number of concerns. These vary from institutional and socioeconomic to technical aspects. One major factor is that, while the rangelands are state owned, their users are private households. Policy decisions should therefore recognise the needs of the private households that depend on these public resources. Adequate technical support for rangeland management has been lacking in most of the countries and there has been very little attempt to incorporate bioclimatic considerations while formulating action plans. One major gap in this respect is lack of problem-oriented research activities.

The main cause of desertification of ranges and grasslands is a combination of improper land-use practices. Overgrazing, neglect of the biodiversity of the system, and increasing monoculture are identified as some of the common problems. Combatting the desertification process requires better information through research and monitoring, implementation of suitable development options, and promotion of indigenous as well as modern technologies for better land management. Capacity building at national and sub-national levels is critical for combatting desertification in mountain areas.

Pastoralism in the Central Himalayas and the Tibetan Plateau - Dr. D. Miller, USAID, Nepal

It is essential to understand traditional pastoral practices prevailing in the area before any development interventions can be made. A large number of people, in excess of 10 million, are dependent on livestock for meeting their livelihood in this area which has unique range resources extending over 2.5 sq. km. It was one of the largest ranges in the world. The important river system of South Asia originated in the

Tibetan Plateau and the Himalayas. The range was home to a wide variety of wildlife and had diverse floral assemblage and forest grazing areas. The pastoral production system was unique and different from other systems. The system was also built around long-distance trade through the use of pack animals. Profound changes were taking place in the pastoral system as a result of modernisation. Improved access had intensified market processes leading to increased sales of yaks. Nomads of the area were being permanently settled, leading to reduced movement of livestock. Herd sizes were no longer adequately regulated, resulting in over stretching of the carrying capacity. Over-grazing was already visible in many areas.

While not all the range grazing lands are in a similar state of degradation, expansion of agricultural land at the expense of grazing land is a major cause for concern. New regulations regarding user rights under community forestry, especially in Nepal, are having negative effects on sheep pasturing. The traditional pasture rights of these nomadic people are being restricted by user communities. Exploitation of mineral resources, limited veterinary services, tourism-related encroachment, etc are also negatively affecting highland pastoral life. In short, many of the problems identified can be ascribed to the modernisation process going on in the area.

The major issues identified were poor understanding of rangeland ecosystems, inappropriate pastoral policies, lack of appreciation for pastoral strategies, ineffective management of wildlife resources, and inappropriate project evaluation criteria. The need to bring in a fresh perspective, which included greater appreciation for pastoral strategies, was emphasised. There is a need to develop appropriate concepts to explain ecosystemic processes and to use alternative methods of cost and benefit analysis to account for natural resources. A systems' approach and bottom-up planning are considered essential for improving the living conditions of these agropastoral groups and planning and management of these range resources. Sensitive ecosystems demand sensitive approaches. Sustainable development requires the use of a holistic approach linking different components of the system, better management of wildlife, and integration of the use of new technology such as satellite imagery, with ground-level research.

Discussion

An appropriate entry point for local communities to be integrated with the planning and management processes for rangeland management should be identified. Groups of herders should be recognised as user groups. Similarly, associations of livestock owners and tribal groups could be developed. Such experience existed in the region. Factors regarding increasing livestock needed to be better understood. Economic returns are as important as social factors such as prestige associated with livestock ownership. The South American experience indicated that the role of animals was greater as altitude increased. More animals provided opportunities to sell some for purchase of crop seeds. Similarly, some of the animals were kept as pack animals (e.g., the alpaca). The West Asian experience also indicated that economic and social factors played key roles in determining livestock number, including the conditions of grazing areas.

Alternative planning approaches for rangeland management were also discussed. It was pointed out that the values and the attitudes of the people were important in determining regulatory mechanisms. Indigenous knowledge had played an important role in managing the system in the past and this resource should be more extensively tapped. The tendency to promote growth at the expense of the overall development of the area should be avoided. The latter can be achieved only by an active participation of the people. Planning and management approaches need to maintain a judicious mix of top-down as well as bottom-up systems. There was a need to distinguish between tribal culture and nomadism. Nomadism was an approach different from the culture of the people. The need for a political commitment to safeguard the rangeland areas was emphasised in view of the pressure to expand agricultural lands.

Session IV: Management of Mountain Watersheds and Forest Resources

Watershed Management is an essential dimension of successful development of fragile mountain ecosystems. In spite of the large number of highly diverse ecosystems within a small geographical area, there are a number of common problems in mountain watersheds. Increased use of marginal and easily eroded lands, overgrazing of fragile upland pastures and widespread deforestation have aggravated poverty and environmental deterioration. What is needed to resolve these problems is a comprehensive approach to mountain resource management and improving the well-being of mountain people that is consistent with the socioeconomic needs of the people and with the carrying capacity of the land and its resources. While these aspects of watershed management have been long understood, practice is still strongly sectoral. The progress that has been made in managing watershed resources and the important lessons being learned need to be carefully reviewed. Management of forest resources also need to be examined in this context.

Status of Watersheds and Forests - *Dr. K.G. Tejwani, Land Use Consultants (Int.), India*

Watershed Management (WSM), within the last 40 years in Asia, has been extremely important and is receiving increasing attention from national and international agencies. However, there still is a need to assess the region's experience on a systematic basis and to identify the future direction needed in managing mountain watersheds in the context of sustainable development of mountain areas. Traditional farming systems, such as shifting cultivation and terracing, are appropriate responses of the people for farming mountain slopes. However, on account of increasing pressures on limited land resources, questions are raised regarding the sustainability of these systems. Deforestation is a major factor behind degrading watersheds with increasing loss of plant and animal species. Reforestation rates are only half as much as deforestation rates in large parts of the Asian mountain areas.

Proper watershed management needs a holistic approach with greater efficiency and effectiveness of watershed management policies and activities. There is considerable knowledge and experience available in the countries of the region which could be shared for mutual benefit through networking, exchange of visits, and training. The prevailing gaps between desirable and actual watershed conditions and the inadequacy of action in implementing watershed management programmes need to be closed. Developing countries need to allocate more funds to watershed management programmes. Ecological and administrative/political boundaries need to be better integrated. Farmers' difficulties in understanding concepts and practices of watershed management should be overcome through their greater participation in watershed planning and management. Continuing lack of integration of related activities need to be corrected. Despite these problems, governments have been responding to the needs of watershed management through greater support to development activities. Even farmers are taking greater interest once they experience its benefits.

Participatory Management of Mountain Resources, Watersheds, and Forest Resources - *T. Michaelson, FAO*

Participatory watershed management seeks to combine the essential components of bottom-up and top-down planning and implementation. It identifies workable mechanisms to establish linkages between decision-makers at different levels - the government, the region, different sectors, and the people living in the watershed. Incorporating people's needs and knowledge and giving them an adequate share in decision-making have been a major challenge in watershed management activities so far. In the past, scientists and technical people have played intermediary roles, providing some link between the government and the people, but this has not been satisfactory as it was *ad hoc*, narrowly focussed, and did not provide a continuing mechanism for dialogue. Government policies have also not been very favourable. When huge investments are made in upstream areas, it has been easier for the government to enact sweeping legislations, protecting upstream areas rather than addressing the needs of upstream people, even when these investment decisions adversely affected these people. While it is common practice to bring forests and watershed areas under government control, experience has shown that the approach is no longer workable.

A number of important points are beginning to emerge. First, watershed management cannot be expected to cope with all the extraordinary geological events experienced at different points in time in the watershed, but the community must learn to live with them. Early warning systems, evacuation plans, and disaster mitigation schemes would be helpful. Second, people have been living in these watersheds for thousands of years, modifying the environment in various ways, and yet most programmes assume that major improvements can be brought about rapidly. Watershed management needs to be seen as an ongoing geological and people-based process in which the government, NGOs, and others can have some impact for some period of time. Third, it should be realised that in any watershed there are different stake holders, both within and outside the watershed, and without their involvement watershed management activities cannot be expected to be effective. Fourth, the role of the government is also changing with governments handing back more of the responsibility to the local community and private groups. Fifth, more and more evidence is showing that people can be fairly effective in managing watershed resources whenever they stand to benefit from it.

Participatory management of watersheds should therefore take into account all the different stake holders and provide adequate opportunities for them to interact with each other. Technical support is needed for these groups so that their decisions and actions are technically sound. It is therefore proposed that a Watershed Commission be established involving all the different actors. It should have representatives of local interest groups, local and national development agencies, different types of NGO, and the private sector. Such a body will function as a clearing house for watershed management activities. The exact composition will vary from place to place but this represents one approach to overcoming the *ad hocism* of the past approaches and allows participation by a large group of interested parties. Obviously there will be cost involved in supporting such a body, but that is the price for introducing a more participatory and, hopefully, a more effective watershed management approach in mountain areas in the future.

The Role of Agroforestry - Dr. Tony Djogo, Polytechnic University of NUSA, Indonesia

Agroforestry issues based on the experience of Timor in Indonesia highlighted many areas of common concern to the upland areas of East Asia. In the past, agroforestry activities focussed on bringing about changes in farmer activities, while watershed management concentrated on environmental problems. There is now a need to integrate the two areas because, without addressing people's needs, the environment will continue to be further damaged while increasing degradation of the environment will make it more difficult to meet people's needs.

Past approaches in the development of agroforestry in upland areas have highlighted different types of problem. The tendency to focus on only tree crops, without considering the food-related priorities of upland farmers, has made it difficult for farmers to adopt and sustain agroforestry practices. The lack of a uniform language of agroforestry has given conflicting signals to the farmers. Agroforestry programmes under forestry agencies focussed only on timber crops. Agricultural agencies emphasised food crops, while environmental organisations concentrated on biodiversity preservation. Similar confusion has also been created by terms such as community or social forestry. Conflicts have also been evident in other areas. Economists tend to focus on those activities giving higher returns while other considerations favoured enhancing farmers' food security. Most public programmes have tended to select public lands for their activities while farmers have clearly preferred to work on their own plots. Similarly, farmers are now favouring commercially-attractive activities, while agroforestry programmes have tended to focus more on ecologically-sustainable options.

Many aspects of agroforestry are already a part of traditional farming systems in these upland areas and efforts made to either understand these or improve existing systems have been limited. The sophistication of local systems in meeting the multiple needs of the farmers through harnessing plant and animal species needs to be better appreciated before introducing changes from outside. Many local technologies have proved to be quite harmful under changing environmental conditions but there are others with potentials for development. Simple aspects like establishing farmer nurseries have been overlooked. Significant improvements are being achieved with stronger participation of farmers in all aspects of research, planning, implementation, and evaluation of agroforestry development in upland areas.

Session V: Sustainable Use and Conservation of Biodiversity

Loss of biological diversity in mountain areas is a serious but quiet crisis. However, the significance of this crisis is still not adequately appreciated. Considered as reservoirs of biological diversity, mountain areas are slowly losing their rich variety of flora and fauna. This is happening not only in the wild through loss of natural habitat on account of deforestation, overgrazing, and other similar problems, but also on farm as mountain farmers are being forced to concentrate increasingly on food production.

Some efforts have been made to develop special protected areas but the biodiversity in the wild and on-farm remains grossly unattended. Governments are also hard pressed to develop the capacity needed to monitor and preserve the natural living wealth of their mountain areas. Some of this is slowly changing, but a great deal remains to be done in this area.

On-farm Management of Biodiversity - Dr. W. Roder, IRRI, The Philippines

In most mountain areas, farmers have maintained high levels of biodiversity in the past because of a number of factors. These are relatively small farms, the need for self-sufficiency, difficulties of access, lack of improved varieties of crops and animals, reducing risks, and spreading the use of labour by using species with different maturity periods.

Higher levels of on-farm biodiversity have also been important for overcoming diseases, pests, and fluctuations in climate and markets. Even within one group of annual crops, farmers may be using species as diverse as self-pollinating rice or wheat, cross-pollinating maize, or a vegetatively multiplied crop such as the potato.

Recently there has been increasing attention on the role of the farmer as the manager of on-farm biodiversity. In the past, preservation was mostly carried out in germplasm banks or in botanical gardens. It is now being argued that whereas some species cannot be preserved in germplasm banks, others have only local importance and preservation in germplasm banks stops the evolution of the species. It was therefore essential to enhance farmers' awareness regarding the need for preserving on-farm biodiversity.

There are, however, a number of problems. Like any other system, preservation depends on the people in these farms and their understanding and priorities. The administrative problems in following up on thousands of species cannot be underestimated. In addition, there are important motivational factors. When farmers are confronted with high-value alternative crops, there may be little incentive to preserve low-yielding species.

While some of the traditional systems are quite harmful in terms of preserving biodiversity, there are also cases in which farmers are using both improved and traditional varieties of plant species. In many of these societies' strong food preferences favoured cultivation of some species and other varieties had cultural and religious significance.

More recently there were also cases where some of the older varieties had become fashionable in the market and therefore also socially acceptable, thereby encouraging farmers to cultivate and market the varieties.

If on-farm biodiversity is to be preserved there is need for more education and greater awareness regarding the value of traditional crops, food habits, farmers' practices, and greater support for soil conservation policies, maintaining traditional germplasm and increasing economic incentives for traditional crops.

Biodiversity and Protected Areas in Qinghai-Xizang Plateau - Prof. Li Bosheng, CAS, China

This vast Qinghai-Xizang plateau has a total area of 2.5 million sq. km. with an average elevation of 4,500m and a population of about 10 million.

The natural conditions that prevail there have given rise to diverse and complex species. The high plateau is important in terms of formation and differentiation of mountainous bio-species, which occupy an extremely important position in the world's biodiversity resources.

The current status of conservation in this high plateau focusses on the issues listed below.

- i) The establishment of protected areas, including natural reserves and national parks. So far 58 natural reserves and national parks have been established, covering 10 per cent of the total area.
- ii) The reduction in poverty is an urgent task in the region, as it has strong linkages with biodiversity conservation. So far, efforts have been made to develop high-value plants, eco-tourism, and adventure trekking for enhancing the economic opportunities of the local people, so that they would be motivated to preserve the biodiversity of the area.
- iii) The effects of global climate change on the plateau are manifest in changes in tree line and grassland lines, Net Plant Productivity (NPP) change, and changes in the vertical vegetation distribution patterns.

Future thrusts in the preservation of biodiversity in the area should focus on

- building up of a comprehensive natural protection system covering the various ecosystems in the region,
- establishing a network of protected zones in the region, and
- the development of environment-supporting "enterprises" around the Qinghai and Xizang plateau region to reduce the poverty of the people in the area.

In all the above activities it is essential that the local people be involved closely so that the preservation activities do not have a negative effect on the local people but promote their well-being and enjoy their full support.

Session VI: Natural Hazards and Disaster Management

Many mountain areas are geologically unstable and experience extreme weather events, increasing the susceptibility to various natural hazards. Some mountain areas are also located in high seismic zones. In spite of these potential risks many parts of mountain areas are becoming densely populated with people modifying fragile environments and moving into highly sensitive areas. One important consequence has been that many natural hazards are increasingly turning into disasters with heavy loss of life, property, and other economic assets.

Environmental changes in upstream areas are also reported to be having significant downstream effects. Development activities have also modified mountain environments bringing with them different types of risks. The increase in risks, however, has not been accompanied by adequate awareness, understanding, and development of the capacity to cope with these problems. Major efforts are needed to develop these aspects for better disaster preparedness in mountain areas.

Speaking from the chair, *Prof. Jack D. Ives*, President of the International Mountain Society, highlighted some of the hazardous phenomena (such as glacial lake outburst floods [GLOF]) or *Jokulhaup*) inherently associated with high mountain environments and emphasised the need for a proper understanding of the respective roles of Man and Nature with regard to natural hazards and disasters in the mountains and their lowlands with examples from Nepal, China, and Iceland.

Mr. Thomas Hofer of the Institute of Geography, University of Berne, spoke on *Upstream Degradation and Downstream Flooding and Sedimentation* with examples based on his study of floods in Bangladesh which showed that floods in the plains are essentially governed by phenomena that occur in the immediate surroundings. Mr. Hofer emphasised the need to understand the processes that cause disasters and hazards better and cautioned that general understanding of these processes is an inadequate basis for action or solution.

The presentation on *Landslide Hazards and Infrastructural Risk Management* by *Dr. Megh R. Dhital* of Tribhuvan University, Kathmandu, was based on studies from Nepal, highlighting the importance of geological knowledge in dealing with landslide problems in the mountain areas. ICIMOD's work in mountain risk engineering, with particular reference to road construction in the mountains, was also briefly highlighted.

Mr. H. Oi, Chief Technical Advisor from JICA to the Water-Induced Disaster Preparedness Technical Centre (DPTC), Nepal, spoke on *Disaster and Sustainable Development of Mountain Areas*, with examples from the disastrous events of 1993 in south central Nepal, and indicated the importance of risk and hazard maps for disaster-prone and disaster-affected areas. He emphasised the need for international cooperation for rehabilitation and reconstruction of disaster-affected areas.

Prof. Li Tianchi of the Institute of Mountain Hazards and Environment, Chengdu, China, spoke on *Natural Hazards and Disaster Management* with examples from China. He emphasised the importance

of a proper understanding of watershed characteristics prior to rehabilitation work and presented a successful example of mulberry farming for sericulture in the reclamation of flood-affected lands in China.

Discussion

Some of the major issues highlighted during the discussion that followed the above presentations are as follows.

- Lack of data to prove or disprove linkages between upland degradation and lowland (the plains) floods. Mountain people (farmers) have been seen to manage their environment - sometimes deliberately triggering changes followed by extensive rehabilitation work. Few of these activities have been studied systematically.
- Analysis of available data does not show a direct correlation between deforestation - erosion in the uplands with floods in the lowlands. Some argue that there are more trees now in the HKH than before.
- No trend in the increase in flood frequency in Bangladesh has been observed. Floods in the plains are governed by local phenomena.
- There is no correlation between rainfall in the mountains and the plains in the HKH.
- Floods in Bangladesh are more influenced by the Brahmaputra River than the Ganga River, including rainfall in Assam, Meghalaya, and Bangladesh.
- Glacial Lake Outburst Floods (GLOFs) are inherently associated with the high mountain environments of the HKH.
- ICIMOD has contributed to the body of knowledge on risk engineering and has produced a useful manual on mountain road construction.
- Governments have also been responsible for damaging environments by implementing technically unsound development projects, for example, environmentally-inappropriate roads, bridges, and dams and generally poor construction methods that are lacking in sound understanding of mountain geology, slope conditions, and hydrological systems.

Areas needing immediate attention were identified as those listed below.

- Greater efforts were required to develop a relevant database for a better understanding of the processes that govern the Himalayan environment.
- Regional cooperation and collaboration were required in the exchange of pertinent data to understand clearly how and to what extent upland environmental degradation (erosion) contributed to floods in the plains.
- A study of river basins at different levels in different geographical settings using similar methods and approaches was required for monitoring changes and identifying critical parameters.
- Preparation of hazard maps for disaster-prone and disaster-affected areas should be given high priority. This would also help increase public awareness and avoid settlements in disaster-prone locations.
- Donors should not only provide relief during disaster periods but also continue to work together with national governments during the rehabilitation period in order to ensure that the pace of national development of the countries affected by disasters does not slow down.

Session VII: Women and Mountain Development

Women in rural areas throughout the developing world play a major role in managing natural resources through their tasks in agriculture, animal husbandry, and in the house. They have a very good understanding of the environment around them and its resources. Women also participate actively in the commercial sectors. Mountain women also perform similar roles but have to do so in a far more difficult environment where travel times for subsistence activities are very large, lands are more difficult to cultivate, and basic facilities and services are lacking. Their key role, in reducing population growth, educating children, improving household environment, better management of natural resources, and diversification of economic activities is gradually being recognised. A major effort is needed to develop their full potentials for sustainable mountain development.

Conceptual Understanding of Gender - Dr. Govinda Kelkar, AIT Institute, Bangkok

The first presentation of this session outlined a theoretical overview of gender and attempted to clarify the distinction between women and development and gender and development. There are two well-known issues that are a manifestation of attitudes rooted in gender. The first is the issue of women's subordination within and outside the household and the second is that of women's access to resource and decision-making. The key problem lies in the relationship between men and women which has evolved over a long past and is based on social, cultural, and educational backgrounds and settings.

At an ideological level, gender cannot be separated from the power which is used to ensure that women continue to remain subordinated and marginalised. There exists an element of structured coercion in society which has today led to women internalising the belief that men are superior to women. This belief is an outcome of the social construction of gender relations.

The economic sphere presents a classic example in which the role of and contributions made by women are ignored. This is specially relevant in farming systems. In this context, modern agricultural systems have eroded the position of women within societies and households.

Organising Mountain Women - Ms. J.D. Gurung, ICIMOD

The second presentation began with a look at how women are affected by the biophysical features of mountains. The changing circumstances of mountain societies brought on by commercialisation, development interventions, tourism, political movements, communication systems, and population growth have a direct or indirect impact on women's work and status. Generally, women's workloads increase while they remain without access to technologies, credit, or rights over resources needed to manage the farm under increasingly difficult conditions.

Improving the status of women and enhancing their capabilities and opportunities to participate fully in the development process is the aim of some agencies in the HKH Region. One effective means is through

the formation and strengthening of women's groups. Examples of successful women's organisations from Pakistan, India, Bangladesh, and Nepal were provided along with a summary of the features of such initiatives.

Women and Technical Skills - Ms. F. Kellker, SDC, Nepal

Out of the three professional courses offered in the Jiri Technical School, Nepal, in health, agriculture, and construction, women candidates have mostly preferred health. This has been successful as there have always been sufficient applicants and jobs for them after they finish the course. Agriculture and construction have come to be perceived as 'male courses'. However, more recently, the number of women in agriculture has increased and a recent survey indicates that potential employers would prefer to employ qualified women rather than men. This decision is guided by the fact that women in comparison to men are seen to be more diligent, sincere, and disciplined.

In the construction profession men feel that, whereas the presence of women will inspire men to be more disciplined, women may not be able to command sufficient respect from labourers if they are placed in middle-level supervisory positions.

Discussion

- While several tools and methodologies for environmental impact assessment and economic assessment were available, tools for the social impact assessment of development projects were lacking and needed to be addressed.
- Law is an important issue. The introduction of modern law has in many cases eroded the rights granted and guaranteed to women under customary law. The patriarchal society continues to hold on to power and this has been the situation over thousands of years.
- The status of women in several mountain societies is still relatively high; better understanding of how this is lost in the process of modernisation is needed.
- Although men migrate to the plains for a living, many of them live in harsh surroundings and send remittances home for their families. We are often dismissive about this caring behaviour of men.
- There should be harmonious development and it should not disturb existing social structures. Being conditioned by education, cultures, and religions, interventions must be disaggregated rather than generic for all areas and contexts.

Four tasks for future work were identified in the discussion:

- undertake additional research in law and how it affects gender relations;
- ensure that the economic contribution of women is reflected in national accounting;
- advocate for joint ownership of resources; and
- document case studies on the higher status of women in mountain areas and incorporate them into the Mountain Agenda.

Session VIII: Review of Selected Mountain Development Processes and Opportunities

A large part of the discussion on mountain development was dominated by problems with little attention given to positive changes, particularly those with a strong economic impact. Some of these dealt with the development of high-value products and tourism, while others were related to increasing urbanisation in some mountain areas. This session focussed on highlighting some of these experiences and their underlying forces.

High-value Crops and Activities - Dr. Tej Partap, ICIMOD, Nepal

Mountain farming is undergoing a process of significant transformation. First, subsistence mountain agriculture is on an unsustainable path manifested by resource degradation, soil erosion, loss of soil fertility, and the increasing poverty of mountain farmers. Second, seen only in a few selected areas, is the increasing commercialisation of agriculture through cash crop farming, leading to the economic prosperity of mountain farmers. The latter situation is seen in areas where infrastructure, such as roads, marketing information and facilities, credit support, and strong technical backstopping, has been developed.

The experience with high-value cash crop farming in the State of Himachal in India, Ningnan County in China, and Ilam and Dhading districts in Nepal showed that commercial farming provided far greater net returns per hectare than the production of cereal crops. Marginal lands unsuitable for cereal cultivation have been brought under high-value tree crops. Different kinds of cash crops can be cultivated depending upon climatic conditions, the 'niche' of particular areas, and prevailing market conditions. To promote the sustainable cultivation of cash crops, it is essential to provide better access through improved transport services, thereby reducing transport and handling costs. Similarly, efforts are required to provide better post-harvest handling methods and facilities such as grading, storage of goods, and availability of marketing information.

A number of problems has also been encountered in cash crop development. It is important to avoid monocultures while promoting cash crops. Harnessing local diversity in the form of cash crops through R & D initiatives requires far greater scientific and marketing efforts. Excessive use of chemicals and pesticides in cash crop production has to be avoided through better awareness and training about environmental impacts and judicious use of these inputs.

The farmers' risk-bearing capacity in the initial stage is low, access to market poor, and the ability to take advantage of existing support institutions almost non-existent. Therefore, in the initial phase of transition, government support in the form of an incentive package is essential. It should also include institutional intervention mechanisms when market failures occur. It has been observed that sometimes the outsiders and not those targeted have taken advantage of such support packages. It is therefore essential to restrict the initial access of such support to the local population only. There are instances of such policies being put into operation in a number of countries of the HKH Region. Efforts should be made to replicate successful cash crop experiences in new areas so that high-value crops can be a practical mechanism for sustained growth of on-farm agricultural income as well as off-farm employment opportunities in poor mountain areas where subsistence agriculture is becoming economically weak and environmentally damaging.

Promotion of Tourism - Dr. K. Banskota, CREST, Nepal

There is a need to examine the potential of tourism for initiating wider-scale development in mountain areas. What is lacking is vision. Prior to the promotion of a particular tourism development package, assessment of the potential for different forms of tourism on a location-specific basis is required. There is no unique packet applicable to all regions. Eco-tourism is one of the many options for the HKH Region. Sustainable mountain

tourism requires a holistic focus on physical, biological, social, and economic aspects in order to maximise the opportunities and mitigate the problems. This requires substantial shifts in policy and priorities at the national level. The governments and their line agencies, NGOs, tourists, private agencies, and the local people have definite roles to play as partners. Success depends on how these partners are organised and coordinated through shared responsibilities, particularly the mobilisation of local people through grassroot institutions. Environmental considerations should be integrated with economic decision-making from the very beginning and at different levels. Proper assessment of environmental resources through economic accounting should receive immediate attention at both local and national levels. A number of major issues has emerged from the Nepalese experience in mountain tourism development: establishing an agency responsible for guiding the development of mountain tourism, management of demand and supply aspects, valuation of the use of natural resources, the need for ploughing back revenue generated by tourism, and integration of mountain tourism development in the overall development strategy.

It is important to operationalise the concept of carrying capacity and unsustainability using a critical factor approach. Identification of internal characteristics of a defined geographical area and its interaction with other regions and an assessment of the potentials and constraints of a region's development may provide the basis for identifying critical factors. These critical factors can be further examined in terms of resources, specific areas or niches, infrastructure, and institutions. They could serve as focal points for both development and policy interventions as well as monitoring. It is not possible to think about preserving all the resources for all time. There may be a need to forego some opportunities. Inter-temporal depletion of some aspects of environmental capital may take place depending on the substitution possibilities available. Nevertheless, conservation of the Himalayan environmental resources should receive prime importance in such an exercise.

Hunting as an aspect of mountain tourism development has potential, but at present most of the national parks and nature reserves in the HKH countries emphasise protection and preservation of biotic diversity. There are very few hunting reserves in the region. Underpricing of natural resources is highly visible and some corrective measures have been adopted in this respect, e.g., in the Annapurna Conservation area.

Urban and Industrial Development - Dr. Pitamber Sharma, ICIMOD, Nepal

In the context of a rapidly increasing population in the mountains, urbanisation has become imperative. What is important is to streamline this process of rapid urbanisation into a desired direction. Experience with urbanisation in the Kathmandu Valley in Nepal and the Dehradun Valley in India provide valuable lessons on the use of natural resources in rapid unplanned urbanisation. The demographic and economic processes operating in the mountains make it quite clear that the space economy of the mountains is being transformed. This transformation has been rapid in some areas and sluggish in others. While the desirability of transformation may be debated in particular demographic and economic contexts, the more fundamental question is how to ensure that this transformation is compatible with the environmental reality and economic needs so that urban areas become the locus of sustainable livelihoods. The role of urban development in the positive transformation of densely populated mountain economies will remain significant in a number of ways. Urban areas can take the pressure off the land by providing a variety of off-farm activities, basic central services to the vast rural hinterland, markets for rural production, and the impetus for the diversification of rural economy.

A mountain-sensitive approach to urban-industrial growth is needed and this has to be guided by a number of considerations such as decentralisation of urban-industrial functions, promotion of non-polluting industries, determination of the range of threshold population for particular urban complexes, implementation of integrated environmental management and a participatory planning process, and promotion of small and medium towns. Managing urbanisation and urban growth on a scale compatible with economic potentials and environmental quality is the major challenge to policy-makers in mountain areas. This challenge has so far been neglected and urban development has tended to be largely spontaneous. Sustainable development of mountain areas calls for innovative policy initiatives for promoting decentralised urban-industrial growth based on local community action.

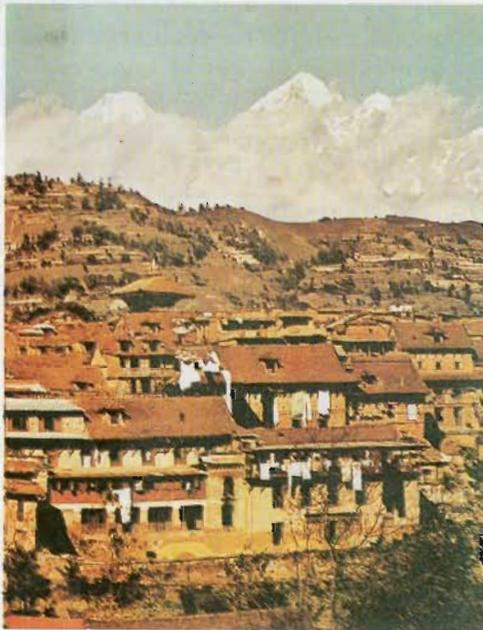
SOME COMMON CONCERNS



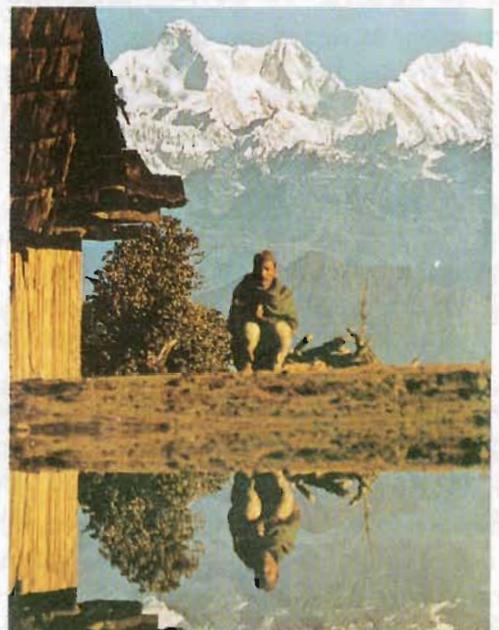
Watershed Conservation and Improved Agriculture



Control of Desertification and Natural Hazards



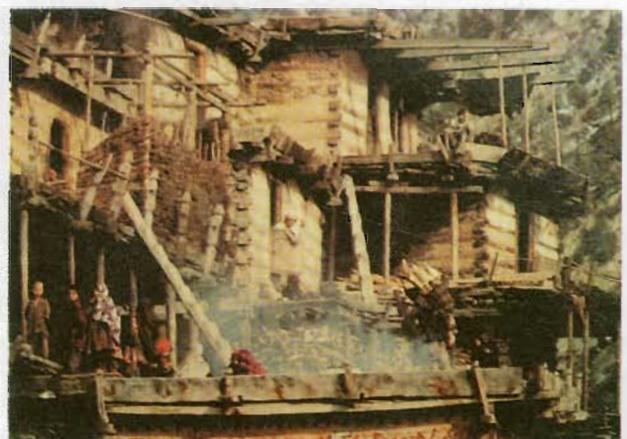
Improved Land-use Planning



Harness Potentials for Tourism



Improved Pasturelands and Animal Husbandary



Improved Living Standards of Mountain Populations

Looking Ahead with Agenda 21

Summary Country Statements

Bangladesh	Kyrgyzstan	Pakistan
Bhutan	Laos	Papua New Guinea
China	Mongolia	The Philippines
India	Myanmar	The Russian Federation
Indonesia	Nepal	Thailand
Iran	New Zealand	Vietnam

Statements by International Organisations

ICRAF CIP IBSRAM UNEP FAO

BANGLADESH

Although the hilly areas of Bangladesh, better known as the Chittagong Hill Tracts, constitute about 10 per cent of the land and one per cent of the population, it is of great socioeconomic significance to the country. The Government of Bangladesh has been taking several measures to raise the living standards of its hill population. The strategy for development not only addresses agricultural development but also the development of social sectors such as literacy, health, and family planning practices and training in newer skills along with strengthening the old and traditional skills and craftsmanship.

In conformity with its pledge at Rio, the Government has recently completed the National Environmental Action Plan with the participation of the local people and grassroots' organisations. It has also prepared a draft Forestry Master Plan and the concerns of the hill area people have been taken into account in the preparation of these documents. The Government has also adopted the local participatory mechanism as an integral part of its national planning process in the preparation of the forthcoming perspective plan, on expiry of the present five-year plan. The Government has also made it mandatory to carry out Environmental Impact Assessment (EIA) for the approval of any development project.

BHUTAN

Being a late comer into the development process, the natural resources of Bhutan are largely intact and it is the policy of the RGOB to ensure that this rich endowment is preserved and that development is sustainable. Thus, in Bhutan, environmental planning precedes environmental degradation and the principles of sustainability are embodied in government policies that are being implemented.

Subsequent to the UN Conference, Bhutan has incorporated the concerns and issues of Agenda 21 into its 7th five-year plan programmes which embody the following six principles: self reliance, sustainability, efficiency and development of the private sector, people's participation and decentralisation, human resource development, and regional balanced development. Bhutan has established bilateral sustainable development cooperation, under which the rich countries provide technical and financial assistance and the developing countries in return share their rich and unique cultural and traditional values and biodiversity.

Emphasis is being given to comprehensive family planning, developing an integrated and more balanced land-use planning capacity, watershed management, hydropower generation, more participatory involvement of the rural people in sustainable resource use and management for individual and collective benefits, implementing a very restrictive and conservation-oriented forest policy, preserving Bhutan's rich biodiversity, maintaining its rich cultural heritage, and strengthening government institutions to ensure efficient forward planning in relation to the environmental impact of new activities.

CHINA

The complex mountain areas of China constitute 66.57 per cent of its total area and 33 per cent of its population live there. Because of social, economic, and geographic constraints, economic development in these mountain areas is slow and even backwards. It is difficult to improve the living conditions of the people, eliminate poverty, and develop the local economies in these poor areas without a strong focus on sustainable use of natural resources, mobilisation of the people, and a substantial investment programme.

China's mountain development priorities focus on 1) the development of national plans of action for mountain areas, 2) the development of mountain database, 3) human resource development, 4) increased international and regional cooperation, 5) population control, and 6) seeking financial assistance.

So far, emphasis has been given to increasing food supply, providing hybrid seeds and plastic film, and building high quality farmlands, including other measures such as afforestation, conservation of water and soil, improving the ecological environment, and export of labour.

In the context of Chapter 13 of Agenda 21, the most important activity would be to integrate watershed management. The experience of China in this field is similar to those experienced by other countries in the region. Effective participation of the local people is the key to developing the economy and to preventing further ecological imbalance.

INDIA

Geological instability interacting with a complex of problems (including population pressure, deforestation, landslides, erosion, water scarcity, outmigration, and poverty) typifies the fragility of the Himalayan ecosystem. Despite all these problems, apparent in the degradation of the Himalayan environment and the poor living standards of its people, the region has several "resource rich spots".

All the initiatives mentioned in Chapter 13 of Agenda 21 are in operation as far as India is concerned. The Government of India has formulated a concrete action plan which is being followed in principle jointly by all the institutions working for the Himalayas and in the Himalayan Region.

Areas being emphasised for the development of the Indian Himalayas include water management and soil conservation, management of forest resources, improving non-conventional energy sources, promoting sustainable farming systems, improving the management of livestock, developing horticulture, preservation of biodiversity and implementation of different conservation strategies, improving transport and communications in mountain areas, promoting tourism, developing industries, improving health and nutrition, and management of natural hazards.

The Government of India has also made it mandatory to carry out Environmental Impact Assessment before implementing any development project and in the case of water resource-related projects it is mandatory for the project proponents to evolve a watershed development programme and delineate the lifespan of the project.

INDONESIA

The high rates of economic growth combined with rising population have put further pressure on the limited land, water, and other natural resources. The Government of Indonesia is adopting a sustainable development process to ensure a balance between economic growth and the conservation of natural resources and the environment.

Indonesia faces high rates of soil loss owing to "unwise" use of upland resources. Neglect of upland agriculture leads to two consequences. First, once the upland soils are severely impaired, it requires large amounts of time and resources for rehabilitation and development. Second, upper-watershed areas or uplands tend to be more crowded and the direct and indirect external consequences of such farming activities contribute to a decrease in welfare conditions. An appropriate policy is therefore required to control soil erosion on highly crowded, upper-watershed areas especially on deep and less erodible soils.

In the sectoral policies, agricultural development will be directed towards raising the quantity, quality, and diversity of agricultural products; environmental development will be directed towards balancing natural resource use and population growth; the forestry programme will strive to preserve approximately 92.4 hectares of protected natural forests and improve the living standards of those living in and around the forest areas; and the water resources' policy will be directed towards controlling damage to the environment, strengthening water resources' institutions, and supporting programmes for the development of regional water resources.

IRAN

The complexity of mountain environments and a long history of human settlements in the mountain areas of Iran has created traditional modes of exploitation with specific modes of resource allocation which not only take into account the constraints of this environment but even change them into favourable advantages. In these mountainous traditional modes of exploitation special attention has been given to all or some of the following points.

Complementary uses of (potential) different micro-environments in each one unit of settlement (village), and/or each unit of production (farm or pasture).

Using strict social regulations (traditions) accepted by everyone to control the pressure exerted upon natural resources, to preserve these vital resource bases for future generations.

Acceptance and even taking advantage of limitations and constraints imposed by the environment by adoption of a territorial organisation of resource allocation, i.e., nomadism.

Existence of various temporal (seasonal) superposition of different modes of production to achieve a multi-objective, land use pattern.

Iran has started to appreciate the specificities of mountain environments and although it has traditional knowledge and experience it is somewhat lacking in scientific experience. Iran seeks to have close interactions with more experienced international research and planning bodies in other countries.

KYRGHYZSTAN

The Republic of Kyrgyzstan has a wide variety of landscape—desert, steppe, forests, alpine meadows, to glacier fields (arctic type). It is very rich in terms of hydropower and mineral resources and has great potential for tourism.

However, heightened geological activity is a major constraint resulting in heavy economic loss and loss of human life. Qualitative implementation of investigations using highly precise and sensitive equipment and automated operative data processing are being used to make prognoses about earthquakes. Preventive measures include qualitative, seismostable constructions. Maintaining greenery in such areas is being emphasised.

Nevertheless intense economic activities carried out to meet modern requirements are exploiting the natural resources without taking into account its specificities thereby destabilising the ecological balance. Sixty-four per cent of the soil in the Republic is subject to erosion and 30 per cent of its pastureland is highly degraded. Contamination with heavy metals has reduced both the variety and quantity of the flora and fauna of the country. Unfortunately, in the discussion of the economic and social development of the Republic, no mention is made of the ecological aspects but measures to mitigate these problems will certainly be included in the national plan of action.

LAOS

The conditions in the mountains of the Lao People's Democratic Republic are in many ways different from those found in many other Asian countries: the population density is low and the natural environment is relatively rich. But increasing population, improved infrastructure, increasing timber prices, and increased foreign investments are exerting pressure on the natural resources. Much of the development potential is in the mountainous areas, where the environmental conditions are particularly prone to deteriorate. Regarding development in the management of natural resources, there are four areas of particular interest to the Government.

Agriculture: Shifting cultivation is the predominant cropping system in the mountains. Stabilisation of shifting cultivation is a major concern to the Lao Government, because of the threat to the forest, water, and hydropower resources. This is attempted through regulations on land use, expansion of the paddy areas, improved cropping systems in the hills, and social development work. Terracing has been introduced in Northern Lao PDR and is gaining popularity.

Forestry: Logging remains an important source of foreign revenue, with a total exported income of US\$44 million in 1993.

Hydropower: Laos currently has two major hydroelectric dams with a total generating capacity of 800 Gwh, of which 80 per cent are exported to Thailand.

Minerals: With the introduction of the government's new economic policy, foreign investment in joint ventures to exploit the rich minerals of Northern Laos is increasing.

Conservation: The Lao Government has become increasingly aware of the need to balance economic development with long-term management strategies and conservation of forests and wildlife. Measures currently being implemented include: legislation to protect the existing forest, management plans to stabilise shifting cultivation, and allocation of about 10 per cent of the land as protected areas where exploitation will be excluded, except for local people already living there.

MONGOLIA

The mountain areas of Mongolia are very rich in terms of diversity, in flora and fauna, and in sun, wind, and hydro energy. However, it faces the same problem of not being able to harness them without destabilising the ecosystem.

Establishing national 'Preserve Zones' for natural landscape and its flora and fauna was identified as a prerequisite for sustainable development of the Mongolian mountain areas. A law regarding special 'Preserve zones' has recently been promulgated. The Government of Mongolia has also realised the imperative favourable conditions it has for the development of tourism and has initiated work in this direction with a focus on establishing and developing the infrastructure. Measures are also being taken for establishing natural national parks, prevention of natural diseases, and the creation of scientific information systems.

The necessity for rational management of the land-use policy has also been realised: development plans and programmes must be reconditioned based on the classification of what kinds of activities are permitted and what kinds are forbidden. Creation of alternative sources of livelihood is also a major problem. Initiatives towards sustainable mountain development have begun in Mongolia, but success can only be achieved if regional and international support and collaboration are also forthcoming.

MYANMAR

The remote mountain areas of Myanmar, besides being isolated, have similar problems as those in other countries of the region; the local populace practice unwholesome activities leading to an ecological imbalance. The Government of Myanmar is endeavouring to change this by providing them alternative means to maintain a decent livelihood. In order to achieve this, it was imperative to launch an integrated mountain area development initiative through the concerned line agencies.

Development activities are being carried out in 16 regions of five states and two divisions of the union of Myanmar and 18 subcommittees have been formed to implement the measures effectively. Development activities are being carried out primarily in the fields of roads and transport, education, health, energy, agriculture, forestry, livestock breeding, communications, mineral exploration and mining, trade, domestic science and vocational training, and public relations.

In addition to the joint efforts being undertaken by the various government line and support ministries, assistance has also been obtained from the UN agencies and international organisations in terms of inputs, transfer of technology, and also cash and services in kind for these development efforts.

NEPAL

The major environmental problems in Nepal are caused by land degradation, deforestation, and pollution. Poverty is the root cause of environmental degradation. Land and forest resources are overexploited because of heavy dependence on the natural resource base, while water and mineral resources are underutilised owing to lack of financial resources and infrastructure.

The areas for priority attention under the current Eighth Plan, a 21-year Forestry Sector Master Plan, and the Nepal Environmental Policy and Action Plan are: reduction in population growth; poverty alleviation; conservation of biological diversity and environmentally-sound management of biotechnology; strengthening and expanding national institutions for training, education, research, and management capability for sustainable development; improving the physical infrastructure; development of water resources; and preservation of the natural heritage of the country and the rich cultural heritage of its people. The National Environmental Impact Assessment (EIA) Guidelines were endorsed in May 1992 and environmental protection was included under the directive principles of the Constitution of Nepal in 1990.

The immense biodiversity extending from the humid tropics to an alpine temperate ecosystem in Nepal can provide an ideal location for further research on biodiversity as well as on land degradation processes. Nepal also considers the importance of research in light of the interrelationships between the people, resources, environment, and development in the mountains.

NEW ZEALAND

Chapter 13 is a useful "enabling and empowering statement which allows, and indeed, requires, policy development for individual countries to employ it." Two issues are important for each of us - first, we should each give priority to establishing the referential database of mountain lands and peoples that has been requested in CSD 95. Second, we should listen to mountain peoples, with their own diversity and experiences. The database is only one dimension of our informing, reorienting, and focussing efforts if we have worthwhile individual country developments of Chapter 13.

It is my personal hope and expectation that New Zealand's traditional sharing in development work across the whole range of mountain terrains from Turkey in the west to China, the Philippines, Vietnam, and Papua New Guinea in the east tends to be focussed on mountains. Mountains in the tropics provide the opportunity for increased relevance of temperate agriculture and forestry. This has been acknowledged by numerous speakers at this meeting. Their grateful allusion to New Zealand and Australia is acknowledged. What I emphasise is what was brought out at the inaugural of the EAPMA conference, that this sharing is a two-way process with benefits to both parties. I am conscious of enrichment of especially non-material kinds which I and other New Zealanders and Australians have derived from shared work experience in continental and insular Asia and the Pacific. Such shared work has included fields as diverse as water resource development, nature conservation, forestry, recreation, tourism, animal husbandry, agriculture, and horticulture, as well as community development and infrastructural development.

PAKISTAN

About 40 per cent of the total area of Pakistan consists of mountains and uplands. Owing to heavy biotic pressure and overexploitation of natural resources, particularly water and vegetation, these mountain areas are subject to degradation. However, soil erosion due to reduction in plant cover is the major problem. The vast mountain areas depict signs of resource base depletion. Unchecked disturbances of the physical, ecological, and biological cycles have upset the entire natural balance:

Realising the importance of the limited natural resources, the Government of Pakistan has initiated several programmes and projects for the rehabilitation of these deteriorating areas.

The 1992 National Conservation Strategy specifically recommends integrated development of mountain areas. The Forestry Sector Master Plan, also formulated in 1992, further prescribes specific programmes for afforestation of the denuded mountain watersheds and conservation of the remaining meagre forest resources.

Pakistan has ample knowledge and technical knowhow in cultivating valuable mountain crops, such as apples and citrus, in the dry mountains and in the management of pastures and grazing lands and is prepared to share its experience with other countries of the region. Any collaborative programme or project in this field shall receive its full support.

PAPUA NEW GUINEA

The problems that exist in the mountainous areas of Papua New Guinea are common throughout the region, namely, population increase, increasing use of marginal lands, rapid depletion of the resource base, and superimposition in the areas of cultural diversity and diversity of flora and fauna. Being an island nation, the coastal and marine resources are equally important as the fragile mountain resources. Therefore, the interrelation between the two is of prime concern.

The mountains of PNG are rich in mineral resources and the pace of development has been quite fast, taking into consideration the fact that these mountain areas had access to roads and infrastructure only in the mid-1960s. After Rio, the Government of PNG has been quite active in implementing the initiatives taken by the conference. The Department of Environment and Conservation is spear-heading programme coordination and programme development based on Agenda 21 and several programmes and projects that complement these initiatives are already underway.

A Tropical Forest Action Plan had commenced, but it was felt to be too narrow in focus and therefore a National Forestry and Conservation Action Plan was formulated. This programme has an intersectoral steering committee and is conducting programmes that demand high technical input. Projects that have been completed include biodiversity mapping of the whole of PNG and rapid resource upgradation. A project that deals with 'land owner awareness' is also being implemented by a non-government organisation. A National Sustainable Development Strategy has been submitted to the Government for endorsement. The Government also accords high priority to strengthening existing institutional capacities and to human resource development.

THE PHILIPPINES

In response to the June 1992 Earth Summit, a national conference attended by representatives from all levels was held in the Philippines to draw up priority actions to set into motion Agenda 21 in line with the provision set out in the

Philippine Strategy for Sustainable Mountain Development. This resulted in the formulation of the Philippines' Agenda 21 under which priority actions were drawn towards combating deforestation, protecting biodiversity, and protecting the atmosphere.

To hasten its implementation, the Philippine Government established the Philippines Council for Sustainable Development in September 1992 and also issued a Memorandum Order. The Philippine medium-term plan now contains the following thrusts: undertaking ecological profiling and physical framework planning at the national, regional, and provincial levels; strengthening financial arrangements and security for upland farmers; affirming and enforcing ancestral land rights and the rights of indigenous communities to develop their ancestral domains using sustainable land management practices; adopting proper pricing and accounting for all forest products and commodities; establishing community-based forest resource management and production systems; and studying the traditional practices of indigenous people in biodiversity conservation for possible emulation.

THE RUSSIAN FEDERATION

The mountain areas of the Russian Federation possess an astonishing diversity of natural, climatic, ethnic, social, cultural, historic, and economic peculiarities.

However, an extraordinary vulnerability of the natural and sociocultural habitats, resulting in the instability and fragility of the ecological balance, is common throughout. This destruction of the natural system, the traditional production methods, and the mountain people's way of life was mainly owing to strict centralisation in planning and management with disregard for mountain specificities. The economic structure was based mainly on the exploitation of natural resources.

The situation has somewhat changed now and the local administrative institutions of the mountainous regions have been entrusted with the authority for the preservation of nature, ecological balance, and the distinctive native cultures. But this effort has to be combined with active scientific-organisational work on the part of the state, the scientists, the community, and international organisations in order to achieve long-term sustainable mountain development. Planning and management have to be done taking into account distinctive local specificities.

Current development efforts are focussing on the preservation and regeneration of resources' potential; preservation and development of the cultural and historical heritage; increase in employment opportunities; development of education, science, and infrastructure; developing alternative energy sources; increasing production; livestock breeding; industry; and health and recreation aspects.

THAILAND

About one-third of the area of the Kingdom of Thailand is mountainous. Like its neighbouring countries, about two-thirds of its forests have been destroyed by nomadic hill tribes whose livelihood depends on shifting cultivation.

To divert mountain development to a sustainable path, the Thai Government is undertaking the activities listed below.

1) In order to restore the forest environment, rehabilitation through reforestation is being given first priority by the Thai Government. 2) To mitigate poverty among the indigenous people living in the mountain areas, increasing their level of income is urgent, therefore, cash crops and new agricultural techniques are being introduced. 3) Perennial crops and fruit trees are being introduced to ensure that the hill tribes settle in one place. 4) To preserve biodiversity, conservation of forests by proclaiming them national parks or wildlife sanctuaries is being carried out. 5) Building roads in remote areas is being given priority to ensure that the mountain people have access to markets. 6) To reduce population pressure on the natural resources, family planning programmes are being implemented even among minority groups. 7) Since all hill tribes speak different languages and are illiterate, education is very important if the government expects to get their cooperation and participation in sustainable development, therefore schools have been built in mountain areas wherever possible.

VIETNAM

The mountainous areas of Vietnam account for 3/4 of the national territory and, like the mountainous areas of other countries in the region, they are in a serious state of degradation. The mountainous areas are mostly inhabited by ethnic groups who constitute 13 per cent of the total population. These minority ethnic groups have been identified as those having a primary concern in the mountainous ecosystems and numerous national programmes have been devised to uplift them, with due consideration given to avoid destabilising the environment on which they survive.

A ministerial-level Committee for Ethnic Minorities and Mountainous Areas (CEMMA) was established in 1993 to look into the sustainable development of mountains and their people. This committee carefully analyses all mountain development programmes that involve exploitation, use, and mobilisation of natural resources in the context of benefits to and development of the ethnic communities.

Future attention will be geared to providing investments to those targetted for fixed cultivation; linking fixed cultivation with forest allocation; assisting communities having favourable conditions for the formulation of commodity production zones; programmes to assist ethnic communities with sudden difficulties; highland socioeconomic programmes; programmes for population and labour readjustment; and programmes for application, training, and universalisation of scientific technologies.

STATEMENTS BY INTERNATIONAL ORGANISATIONS

ICRAF

International Centre for Research in Agroforestry

The highlands of eastern and central Africa form an important region, both economically and from an environmental point of view. However, the high population growth rate has led to intensive cultivation resulting in environmental degradation, deterioration of the water resource base, and reduction in agricultural productivity. To address these problems, seven different agricultural research centres and national agricultural research programmes have launched a collaborative initiative called the African Highlands Initiative to look at ways of improving nutrient availability, reducing nutrient losses, improving nutrient cycling, synchronising nutrient availability with needs, and protecting plants under intensive cultivation systems. The overall governance of this collaborative initiative, coordinated and facilitated by ICRAF, falls under the Association for Strengthening Agricultural Research in Eastern and Central Africa which is made up of 10 different national programmes in the Region. ICRAF is keen to share the information and experiences gained from the above programmes with mountain areas in Asia.

CIP

International Potato Centre

Consortium for Research and Development in the Andean Ecoregion (CONDESAN) was launched to catalyse and bring together all efforts to develop the Andean ecoregion and basically to integrate research and development activities. It has had successful experiences in several of its initiatives. But what is important is a global link. CIP has recognised the use of CONDESAN's expertise and the importance of learning from the experiences of other areas. It is therefore integrating with ICRAF and ICIMOD in a global initiative towards sustainable mountain development.

CIP hopes that this collaboration will come up in the near future and that there will be a potential exchange of useful knowledge and experiences between the Himalayas, the highlands of eastern Africa, and the Andes.

IBSRAM

International Board for Soil Research and Management

To harmonise existing research with a view to improving the effectiveness of its outputs and outcomes and to target and implement new research where it is thought to be needed, six consortia, under specific topics, have been formed. This is a very important initiative and, quite clearly, it is relevant to ICIMOD and ICIMOD cooperatives. They have a very important role to play in all this, especially in ensuring that efforts and initiatives that have begun in this respect are sustained and produce results in the long run.

UNEP's three functional strategies in support of Agenda 21, Chapter 13, are comprised of: a) environmental assessment of mountain ecosystems, b) environmental policy development, and c) facilitating environmental management responses with special focus on support to environment-related research and national capacity building.

UNEP will focus on regional issues in the Mountain Agenda. The state of the Himalayan environment is a concern for UNEP and it is hoped that there will be close collaboration with ICIMOD in this area. UNEP is, for instance, negotiating its contribution of funds to the ICIMOD project on the State of the Environment and Development of the Hindu Kush-Himalayas. The Terrestrial Ecosystem Branch is ICIMOD's counterpart in UNEP.

Mountains did not emerge as a subject for a special chapter until fairly late in the preparatory negotiations of UNCED. The incorporation of a chapter on sustainable mountain development in Agenda 21 was mainly due to the efforts made by a group calling itself "Mountain Agenda", consisting of the International Mountain Society, the Swiss Development Cooperation, the United Nations University, the East West Centre, IUCN, the University of Bern, the Russian Academy of Sciences, and the International Centre for Integrated Mountain Development (ICIMOD). Several UN agencies and the World Bank also provided inputs including cost estimates to the UNCED secretariat.

The *ad hoc* inter-agency meeting on Chapter 13 convened by the Task Manager, FAO, in March 1994, and the NGO planning workshop on the Mountain Agenda convened by The Mountain Institute (TMI), have produced a productive cooperative network of Inter-governmental Organisations and Non-governmental Organisations concerned with sustainable mountain development. There is agreement that a political and economic "mountain lobby" needs to be generated enabling mountain people to fully demonstrate their potential contribution to sustainable development, with a thorough understanding of the specificity of mountain issues, similar to the outcome of the debates on small island states.

The main proposals for action, identified through a broad participatory process involving the major NGOs, include five areas in which progress is deemed to be urgently needed: poverty eradication; strengthening country capacity; raising awareness through the preparation and organisation of a World Conference on Sustainable Mountain Development; and formulation and negotiation of regional or subregional mountain conventions and possibly the development of a global mountain charter.

The SUDEMMA Call to Action

Preamble

From December 13-15, 1994, representatives from 20 Asian countries and more than 10 international agencies, over 60 participants in all, met in Kathmandu, Nepal, for the first-ever discussion on the Sustainable Development of Fragile Mountain Areas of Asia.

The Conference was organised by the International Centre for Integrated Mountain Development (ICIMOD) at the request of the Food and Agriculture Organization (FAO) of the United Nations, the Task Manager for Chapter 13 of Agenda 21: "Managing Fragile Ecosystems: Sustainable Mountain Development". The financial support was provided by the Swiss Development Cooperation, UNEP, FAO, and the United Nations University.

- ▶ The Conference was inaugurated by the Rt. Hon'ble Prime Minister of Nepal, Mr. Manmohan Adhikari, who also gave the inaugural address.
- ▶ The keynote address was delivered by Mr. A.Z.M. Obaidullah Khan, Assistant Director General of FAO and Regional Representative for Asia and the Pacific.
- ▶ Ms. Savitri Kunadi, Vice-Chairperson of the UN Commission on Sustainable Development, also spoke at the inaugural session on behalf of the Commission.
- ▶ Delegates expressed their gratitude and appreciation to the Prime Minister, Mr. A.Z.M. Obaidullah Khan, and Ms. Kunadi for their valuable contributions to the Conference.
- ▶ Efforts made by ICIMOD to bring together the delegates and make possible this first-ever discussion on the fragile mountain areas of Asia were appreciated.
- ▶ In 11 sessions 22 presentations were made on major subjects affecting sustainable mountain development in Asia.
- ▶ All country delegates gave short presentations on country-specific priority problems and issues.

Based on the presentations and discussions held, the Conference delegates made the following recommendations.

A. FIELD-LEVEL ACTION

The Conference agreed that urgent action was needed to commence and accelerate activities in mountain areas that would lead directly to the improvement of the livelihoods of mountain people and their environment. More specifically, the Conference recommended

1. Poverty eradication and economic development through:
 - the development of the comparative advantages of mountain areas for the production and provision of mountain-specific goods and services;
 - the promotion of sustainable mountain farming systems, including locally-sustainable measures for the adoption of traditional and improved technologies for soil conservation, soil nutrient and fertility management, water management, and biomass management;
 - improved access to extension and other services for rural areas;
 - planning and development of urban centres for marketing of goods and provision of centralised services; and
 - the development of mechanisms that will ensure that reasonable benefits derived from mountain resources accrue directly to the mountain people.
2. Sustainable management of natural resources through:
 - the integration of indigenous knowledge in mountain development processes;
 - the enhancement of local capacities for mountain resource management;
 - the restoration of ecologically-degraded lands; and
 - the conservation and sustainable use and management of biodiversity.
3. Gender-balanced decision-making in environment and development policies and programmes through:
 - equality before the law;
 - the recognition of the economic value of women's work;
 - joint ownership of resources; and
 - sustaining the relatively high status of mountain women.
4. Preservation of cultural heritage.
5. Reducing the vulnerability to mountain disasters through:
 - the generation of global awareness;
 - technical assistance; and
 - rehabilitation programmes for the people affected.

B. SUPPORT MECHANISMS

The Conference noted the lack of a cohesive focus on sustainable mountain development at different institutional structures with a (potential) mandate in this field and agreed that efforts should be made to put the issues raised in Chapter 13 of Agenda 21 and those identified at this Conference higher up on the agenda of institutions with a major responsibility for implementing Agenda 21. More specifically, the Conference recommended

1. The establishment of National Mountain Task Forces/Commissions/Focal Points for:
 - examining the issues raised by this Conference in the context of Chapter 13 of Agenda 21;
 - developing National Plans of Action for Mountain Areas in their respective countries;
 - helping to integrate these national action plans into national development programmes;
 - conducting basic research to generate mountain databases;
 - developing linkages and networking between national/local agencies, including NGOs, concerned with the management of mountain environments and improving the economic conditions of mountain people;
 - sensitising policy-makers and the general public about the role of sustainable mountain development and its problems and opportunities and developing a mountain perspective in different development activities;
 - helping to mobilise the support needed to undertake these activities; and
 - helping to sensitise private-sector activities to the sustainable development of mountain areas.
2. Designation of focal points for mountain development by subregional, regional, bilateral, and multilateral agencies to:
 - reinforce and emphasise a mountain development orientation in the respective agency;
 - form collaborative linkages and partnerships; and
 - prioritise mountain development issues.
3. Stronger collaboration among the mountain countries of Asia in order to share experiences, data and information, policies, technologies, methodologies, and management systems related to the sustainable development of mountain areas through:
 - the establishment of an Association of Asian Mountain and Upland Institutions;
 - intensifying linkages among (sub) regional institutes for mountain development; and
 - ICIMOD taking a leading role in Asian collaboration in sustainable mountain development.
4. Capacity-building through:
 - adapting educational systems at school and university levels to mountain development needs;
 - teaching about 'own' environments at different levels;
 - reorienting extension systems to mountain people; and
 - developing human and institutional resources.
5. Financing through:
 - increasing resource allocation within the national budgets for mountain areas;
 - mechanisms for reimbursement of mountain services rendered to lowland areas (e.g., by exploring introduction of innovative tariff systems);
 - mobilising local financing mechanisms;
 - the Global Environmental Facility (GEF); and
 - creating special funds for the education of mountain people.

Chairperson of the Dhaireni Pakha Forest Users' Group, Mr. B.L. Shrestha, describing the rehabilitation activities undertaken during the past two years in a degraded site with some support from ICIMOD



Mr. P.B. Shah, ICIMOD, explaining the effects of rehabilitation strategies

The District Forest Officer, Mr. A.R. Sharma, introducing the district and the forestry-related activities undertaken



Field Visit to Dhaireni Rehabilitation Site, Kavrepalanchok District

On the fourth day of the Regional Conference, the Participants were taken on a field visit outside the Kathmandu Valley to observe and interact with the local population involved in some of the field activities of ICIMOD.

The project visited was the 'Rehabilitation of Degraded Land in Mountain Ecosystems' Project, Nepal Site II, Kavrepalanchok District which is being implemented at Bajrapare (Site I) and Dhaireni (Site II) in Kavrepalanchok District. The sites were established in April 1993. The activities of the project focus on the rehabilitation of the degraded community forest in *Bajrapare ko Ban* (Bajrapare) and *Dhaireni Pakha ko Ban* (Dhaireni) with the involvement of local communities at all levels of project planning, implementation, and site management.

The primary objective of this action-research project is to improve the production of biomass and the range of other useful products from the degraded forest by facilitating traditional methods and incorporating new technologies in their activities. In addition, the project also aims to demonstrate the usefulness of nitrogen-fixing plants, hedgerows, and grass strips as a soil-water conservation method and a production option in forestry. Demonstration of water-harvesting techniques is also one of the main project activities. Research studies in soil erosion, species' performance, and natural regeneration are also undertaken among the main activities of the project (see Table 4 for more details).

The main collaborating institutions for this project are the Forest Users' Group Committees of Bajrapare and Dhaireni, the Village Development Committees of Rabi-Opi (within which Bajrapare lies) and Panchkhal (within which Dhaireni lies), and the District Forest Office, Dhulikhel.

Following a brief presentation by the leader of the Forest User Groups on the project activities, participants raised a number of questions. Some of these were related to the nature of appropriate biomass species, while others pertained to issues of leadership, community interest and participation, and economic benefits derived from these activities.

Following this, two presentations were organised. The first one was by the District Forest Officer who provided a brief overview of the conditions of forests in the district and the measures being undertaken by the Government to promote better management of district forest resources. The second presentation dealt with another field-level action-research project being implemented by ICIMOD in the same watershed which has attempted to quantify resource degradation processes brought about by human intervention in mountain ecosystems. The presentation focussed on the detailed micro-level data generated on different aspects of resource degradation. The participants had extensive discussions on both of these presentations.

Field Visit to District Administration Office, Kavayam District



Regional Conference on
Sustainable Development of Fragile Mountain Areas of Asia
(December 13-16, 1994)

DETAILED PROGRAMME

DAY ONE
December 13, Tuesday

8.00-9.00

REGISTRATION

9.00-10.30

INAUGURAL SESSION

Welcome Address - **Mr. Egbert Pelinck**, Director General, ICIMOD
Opening Address - **Ms S. Kunadi**, Vice-chairperson, UN CSD
Keynote Address - **Dr. A.Z.M. Obaidullah Khan**, Assistant Director General and Regional Representation for Asia and the Pacific FAO, Bangkok
Inauguration - Rt. Hon'ble Prime Minister of Nepal **Mr. Man Mohan Adhikari**
Inaugural Address - Rt. Hon'ble Prime Minister
Vote of Thanks - **A.S. Karki**, ICIMOD

10.30-11.30

SESSION I

Sustainable Development of Mountain Areas: Restoring the Environment and Combating Poverty

Chair: **Dr. John Mellor**, John Mellor Associates Inc., Washington D.C.
Speaker: **Dr. M. Banskota**, ICIMOD
Rapporteur: **Dr. P. Sharma**, ICIMOD

11.30-1.00

SESSION II

Sustainable Mountain Farming Systems

Chair: **Dr. Bruce Scott**, Deputy Director General, ICRAF, Nairobi
Speakers:

- Soil erosion and soil fertility management - **Dr. J.K. Syers**, Director of Research, IBSRAM, Thailand
- Dryland agriculture development - **Dr. M. Saxena**, ICARDA, Syria
- Management of shifting agriculture - **Dr. K. Rerkasem**, Chiang Mai University, Thailand

Rapporteur: **Dr. Tej Partap**, ICIMOD

2.00-3.30

SESSION III

Management of Rangelands and Grasslands and Control of Desertification

Chair: **Prof. K.F. O'Conner**, Professor Emeritus (Range Management) Lincoln University, Canterbury, New Zealand
Speakers:

- Rehabilitation of degraded ranges and pastures - **Dr. N. Mohammed**, Director Rangeland Research Institute, NARC, PARC, Pakistan
- People affected by degraded ranges and pastures - **Dr. D. Miller**, USAID, Kathmandu
- Control of desertification - **Dr. Wang Tao**, Institute of Desert Research, Lanzhou, CAS, China

Rapporteur: **Mr. S. Sharma**, ICIMOD

4.00-5.30

SESSION IV

Management of Mountain Watersheds and Forest Resources

Chair: **Prof. Li Wen Hua**, CISNAR, CAS, China
Speakers:

- Status of watersheds and forests - **Dr. K.G. Tejwani**, Director, Land Use Consultants (Int), India
- Participatory management - **Mr. T. Michaelson**, Senior Officer, FAO, Rome
- Agroforestry in mountain development - **Dr. Tony Djogo**, Director, Agriculture Polytechnic, University of NUSA, Indonesia

Rapporteur: **Mr. B.R. Bhatta**, ICIMOD

DAY TWO
December 14, Wednesday

9.00-10.30

SESSION V

Sustainable Use and Conservation of Biodiversity

Chair: **Mr. John McEachern**, Senior Advisor, IUCN, Nepal

Speakers: ● On farm management of biodiversity - **Dr. W. Roder**, IRRI, Philippines
● Biodiversity and protected areas - **Prof. Li Bosheng**, Institute of Botany, CAS, China

Rapporteur: **Prof. P. Shengji**, ICIMOD

11.00-1.00

SESSION VI

Natural Hazards and Disaster Management

Chair: **Prof. J. Ives**, International Mountain Society, USA

Speakers: ● Upstream degradation and downstream flooding and sedimentation - **Dr. T. Hofer**, Institute of Geography, University of Berne, Switzerland
● Landslide hazards and infrastructural risk management - **Mr. B. Deoja**, Director General, Department of Civil Aviation, His Majesty's Government of Nepal
● Disaster preparedness in mountain areas - **Mr. H. Oi**, Chief Advisor, JICA, Water Induced Disaster Prevention Technical Centre (DPTC), Nepal

Rapporteur: **Prof. S.R. Chalise**, ICIMOD

2.00-3.00

SESSION VII

Women and Mountain Development

Chair: **Ms. Carroll Long**, Resident Representative, UNDP, Nepal

Speakers: ● Women and environment - **Dr. Govinda Kelkar**,
● Organising mountain women - **Ms. J. Denholm Gurung**, ICIMOD
● Women and technical training - **Ms. F. Keller**, Training Adviser, JIRI Technical School, SDC, Nepal

Rapporteur: **Mr. A. Bhatia**, ICIMOD

3.30-5.00

SESSION VIII

Review of Selected Mountain Development Processes and Opportunities

Chair: **Dr. K. Rajan**, Advisor, Planning Commission, India

Speakers: ● Development of high-value crops - **Dr. T. Partap**, ICIMOD
● Promotion of tourism - **Dr. K. Banskota**, Director, Centre for Resources and Environmental Studies (CREST), Nepal
● Urban and industrial development - **Dr. P. Sharma**, ICIMOD

Rapporteur: **Mr. S. Sharma**, ICIMOD

DAY THREE
December 15, Thursday

9.00-3.30

SESSION IX

The Asian Mountain Agenda: Looking Ahead with Chapter 13 (UNCED Agenda 21)
(Summary Country Statements)

Chair: **T. Michaelsen**
Speakers: Country Delegates

9.00-10.30 Afghanistan
Bhutan
China
India
Indonesia
Iran

Tea/Coffee Break

11.00-1.00 Laos
Kyrgyzstan
Mongolia
Myanmar
Nepal
New Zealand

2.00-3.30 Pakistan
Papua New Guinea
Philippines
Russia
Thailand
Vietnam

Rapporteur: **Ms. Greta Rana, ICIMOD**
Ms. Archana Singh Karki, ICIMOD

Tea/Coffee Break

4.00-5.00

SESSION X

Concluding Session

SUDEMAA (Sustainable Development of Fragile Mountain Areas of Asia) Declaration

Chair: **Mr. Egbert Pelinck, Director General, ICIMOD**

DAY FOUR
December 16, Friday

10.00-2.00

Field Visit

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ICIMOD Workshop Series

The International Centre for Integrated Mountain Development began professional activities in September 1984. The primary concern of the Centre is to search for more effective development responses to promote the sustained well-being of mountain people. One of the continuing activities of ICIMOD is to review development and environmental management experiences in the Hindu Kush-Himalayan Region. Accordingly, International Workshops/Meetings are organised in major fields to review the state of knowledge and practical experiences and also to provide opportunities for the exchange of professional expertise concerning integrated mountain development. The reports published in this series are given below.

- **International Workshop on Off-farm Employment Generation in the Hindu Kush-Himalaya**
17-19 May, 1986, Dehra Dun, India
- **International Workshop on Mountain Agriculture and Crop Genetic Resources**
16-19 February, 1987, Kathmandu, Nepal
- **International Workshop on Women, Development, and Mountain Resources: Approaches to Internalising Gender Perspectives**
21-24 November, 1988, Kathmandu, Nepal
- **International Expert Meeting on Horticultural Development in the Hindu Kush-Himalayan Region**
19-21 June, 1989, Kathmandu, Nepal
- **International Expert Meeting on Apicultural Development in the Hindu Kush-Himalayas**
21-21 June, 1989, Kathmandu, Nepal
- **Regional Workshop on Hydrology of Mountainous Areas**
11-15 December, 1989, Kathmandu, Nepal
- **Consultative Meeting on Mountain Risk Engineering**
20-22 February, 1990, Kathmandu, Nepal
- **International Workshop on the Role of Institutions in Mountain Resource Management**
1-4 May, 1990, Quetta, Baluchistan, Pakistan
- **Seminar on Rural Energy and Related Technologies in Nepal**
26-28, March, 1991, Kathmandu, Nepal
- **International Workshop on Mountain Off-farm Employment**
17-20 February, 1992, Kathmandu, Nepal
- **Inspirations in Community Forestry**
1-4 June, 1992, Kathmandu, Nepal
- **ICIMOD Methodology Workshop on Rehabilitation of Degraded Lands in Mountain Ecosystems of the Hindu Kush-Himalayan Region**
May 29 - June 3, 1993, Kathmandu, Nepal
- **International Workshop on Institutional Strengthening for Sustainable Mountain Agriculture**
28-30 July, 1993, Kathmandu, Nepal
- **Remote Sensing Applications to the Planning and Management of Environment, Natural Resources, and Physical Infrastructure**
Oct. 10 - Nov. 6, 1993, Kathmandu, Nepal
- **Indigenous Knowledge Systems and Biodiversity Management**
13-15 April, 1994, Kathmandu, Nepal
- **Mini- and micro-Hydropower for Mountain Development in the Hindu Kush-Himalayan Region**
13-17 June, 1994, Kathmandu, Nepal

These Workshops were attended by experts from the countries of the Region, in addition to concerned professionals and representatives of international agencies. A large number of professional papers and research studies were presented and discussed in detail.

Workshop Reports are intended to represent the discussions and conclusions reached at the Workshop and do not necessarily reflect the views of ICIMOD or other participating institutions. Copies of the reports are available upon request from:

Participating Countries of the Hindu Kush-Himalayan Region

- | | |
|--------------------------------------|-------------------------------------|
| <input type="checkbox"/> Afghanistan | <input type="checkbox"/> Bangladesh |
| <input type="checkbox"/> Bhutan | <input type="checkbox"/> China |
| <input type="checkbox"/> India | <input type="checkbox"/> Myanmar |
| <input type="checkbox"/> Nepal | <input type="checkbox"/> Pakistan |

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