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CHAPTER 13

Managing Fragile Ecosystems: Sustainable Mountain Development

-- Theodora Carroll-Foster and Hugo Li Pun --

THE NATURE OF THE PROBLEM

This chapter is focused on mountain environments as one of the major eco-systems on the planet which is essential to the survival of the global eco-system, and which, like deserts, polar caps and coral reefs, are one of the most fragile planetary eco-systems. Mountain eco-systems are rapidly changing due to their susceptibility to soil erosion and landslides, rapid loss of habitat and genetic diversity, increasing human populations, increasing human recreational/tourism use and deteriorating air quality shown by the pollution now found in the ice on the highest mountain tops. On a global scale there is considerable poverty among mountain inhabitants, which contributes to this environmental degradation.

About 10% of the global population relies on the resources of higher mountain slopes for survival, while some 40% occupy and rely on resources from the adjacent medium and lower watershed areas. Over 50% of the world's population is affected by mountain ecology and the degradation of its watershed areas, but relatively little attention has been paid to this fact.

Mountain eco-systems contain considerable biodiversity and are home to many endangered species. Because of their vertical dimension, they include a rich variety of ecological systems. A mountain may include a number of different climatic systems, representing microcosms of larger habitat diversity. Mountain eco-systems are also very sensitive to climatic changes.

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Chapter 13 focuses on the need for more information about mountain ecology, resource potential and socio-economic activities in these eco-systems. The serious problem of ecological deterioration in watershed areas (including soil erosion, deforestation, loss of biomass cover, excessive livestock grazing, cultivation of marginal lands etc.) is also highlighted as an important problem and the need for integrated watershed development programs is proposed.

PROGRAM AREAS AND OBJECTIVES

Chapter 13 identifies two major program areas, each with a number of objectives. These are briefly outlined below.

1. **Improving the knowledge of ecology and sustainable development of mountain ecosystems by:**
 - surveying the different forms of soils, forest, water use, crop, plant and animal resources;
 - developing database and information systems for the integrated management and environmental assessment of mountain ecosystems;
 - improving the ecological knowledge base with the participation of local communities;
 - strengthening the communications network for those concerned about mountain issues;
 - improving coordination of regional efforts to protect fragile mountain ecosystems; and,
 - improving information for evaluation of environmental risks and natural disasters in mountain eco-systems.

2. **Promoting integrated watershed development and alternative opportunities through:**
 - developing appropriate land-use planning and management in mountain-fed watershed areas by the year 2000;
 - promoting sustainable income-generating activities and improving infrastructure and services to protect livelihoods of local communities and indigenous people; and,
 - developing the technical and institutional arrangements needed in countries to mitigate the effects of natural disasters.

The Chapter recognizes the need for using an integrated approach for conserving, upgrading and using the natural resource base of land, water, plant, animal and human resources.

The objectives are sound for the first program: diagnosis, maintenance and generation of databases to facilitate integrated management of resources, participatory research on sustainable technologies and agricultural practices, networking for communications, and clearing-house coordination.

The objectives for the second program are more ambitious: development of appropriate land-use planning by the year 2000 to prevent soil erosion; increasing biomass production and maintaining ecological balance; promoting income-generating activities and improving infrastructure and social services especially for local/indigenous communities; and developing arrangements to mitigate effects of natural disasters.

CANADIAN POSITIONS AT RIO

1. Official Canadian Position

Sustainable mountain development was not a major issue for Canada, though the government did support the general thrust of this chapter. Canada thought it was well placed to ensure sustainable mountain land use through its Green Plan, the Canada Land Inventory and the Forest Inventories.

2. Non-Governmental Organizations

Canadian NGOs continue to maintain that mountain eco-systems are among the most fragile and essential to the well-being of the planet. Beyond their watershed potential, they are home to considerable biodiversity and to many endangered species, and so require the highest degree of conservation and protection. More information is needed about these eco-systems, but it ought not to be used as an excuse for increasing tourism and recreational development. Many NGOs, specializing in wilderness issues, continue to lobby for endangered spaces or habitat as well as endangered species. However, neither these groups nor the Indigenous Peoples who were stewards of the mountain regions, are given adequate attention, input or responsibility in continuing to maintain these areas.

3. Business and Industry

Canadian business and industry supported the official Canadian position on this chapter. In particular, the concept of developing and strengthening national and regional centres for watershed management was encouraged.

4. Indigenous

Indigenous Peoples often live in and rely upon mountain eco-systems, but, due to their often impoverished and disempowered status, their needs and wants have often been ignored to their detriment that of their fragile eco-systems.

Indigenous Peoples recommend the need for support in establishing Indigenous NGOs, Indigenous knowledge institutions and financial institutions to support sustainable development. Indigenous rights must be recognized to protect their lands, culture and language which inevitable will preserve their sustainable economic and environment regimes and their sustainable cultures.

COMMITMENTS MADE BY CANADIANS

1. Legally-Binding Documents

None.

2. Political Pronouncements

None.

3. Alternative NGO Treaties and Kari-Oca

NGO Treaties

At the same time as UNCED, two major international events were also held at Rio: the International Non-Governmental Organization Forum (Global Forum), and the Kari-Oca Conference. At the Global Forum, 3,100 NGOs discussed a number of matters related to environment and development and produced a parallel set of documents: an NGO Earth Charter and 39 Alternative NGO Treaties. Canadian NGOs played a significant role in developing the treaties and took a lead in coordinating their dissemination.

While an NGO Treaty focusing on sustainable mountain development was not written at the NGO Global Forum in Rio, several Canadian NGOs are considering the possibility of preparing such a treaty and then circulating it globally.

Kari-Oca

The second alternative forum at Rio was the International Conference on Territory, Environment and Development (the Kari-Oca Conference). The Kari-Oca Conference was held immediately prior to UNCED by and for the world's Indigenous Peoples. More than 650 Indigenous representatives participated in meetings and cultural events during the conference. They developed and adopted a 109-point Indigenous Peoples' Earth Charter.

Many of the articles agreed to under the heading of "Lands and Territories" would be of relevance to mountain areas, just as they are to any other lands inhabited by Indigenous Peoples. For example, Article 33 claims that "*Indigenous Peoples' inalienable rights to land and resources confirm that we have always had ownership and stewardship over our traditional territories. We demand that this be respected*". These and other issues of rights over traditional lands reflected in the Indigenous Peoples' Earth Charter are relevant to this chapter on mountain eco-systems.

DEFICIENCIES, GAPS AND CONSTRAINTS WITHIN CHAPTER 13

The two stated programs need to be closely interrelated. In the document the process of generation of knowledge is viewed separately from that of diffusion and application of knowledge. A systems approach is needed to look at both processes, so generated knowledge could be used for development programs, and to learn from on-going development experiences. Also research is needed to assess the impact of changes in one eco-system or watershed on neighbouring ones (downstream effects).

- A more holistic concept is required. In Chapter 13 environmental issues are separated from socio-economic ones. Sustainable development needs to consider the promotion of economic sustainability, the equitable distribution of costs and benefits, and the rational use of natural resources and the preservation of the environment and its overall diversity. If these factors are not interrelated developing countries will not be inclined to protect the environment, and poverty and inequity will prevail. The last two factors provide a potentially explosive mixture for social unrest and political instability.
- Human resource development is given a very restricted focus: on environmental issues and for indigenous mountain populations. But, environmental concerns should be promoted at all levels (decision-makers, researchers, development agents, managers/users of resources) and on a holistic basis.
- Insufficient attention is paid to the creation of awareness among developing country populations, among research managers in international organizations and researchers in developing countries.
- A strategy is needed to incorporate environmental concerns into existing research and development organizations, and translate them into specific programs. The creation of new, separate institutions will dilute the use of present resources or isolate environmental efforts from other development activities.
- Inadequate definition of methodologies exists, including the actual implementation of specific cases using holistic approaches, and the documentation of experience.

- Lack of attention is given to the diffusion of experiences, which could create further commitments, give credibility to different approaches, and have wider impacts on managers and decision-makers.
- The approach noted for strengthening the scientific research capacity is too restrictive since it mainly emphasizes meteorology, hydrology, forestry, soil sciences and plant sciences, but leaves out issues such as the social sciences, ecology, animal sciences, and systems analysis that are critical for sustainable development in mountain areas.

Alternative approaches to handling the various gaps in the Chapter could include:

- a more holistic perspective for research;
- better linkages between research and development efforts;
- increased capacity for the application of policies and technologies that contribute to preserving/enhancing the environment through specific research studies;
- building environmental concerns into on-going research, training and development efforts, including existing institutions and networks;
- better focusing of programs targeted to specific mountain/eco-regions; and,
- developing specific cases or lessons learned for those eco-regions.

COMPARISON BETWEEN CURRENT CANADIAN GOVERNMENT POLICY AND COMMITMENTS MADE

The Canadian government's view appears to be largely that maintaining or expanding "inventories" gives an adequate picture of the eco-system. Although, Canada is expanding the park system, it is also expanding tourism traffic and commercial ventures within the parks. Moreover, logging is still permitted in such parks and eco-systems. These initiatives cause concern for many who are worried that further intrusions into the remaining uninhabited mountain eco-systems will be highly disruptive to their sustainability and the future of their species.

CANADIAN ACTIVITIES EVOLVING THROUGH THE SUSTAINABILITY PROCESS

In Canada a number of programs related to mountain regions have been undertaken by Canadian institutions. Some examples follow.

- Forestry and Highlands: Laval, Lakehead, York, University of Toronto.
- Semi-arid lands, soils and pastures: McGill, UBC, Saskatchewan, Alberta.
- Common property, tenure, indigenous minorities: Simon Fraser, York, St. Mary's, Manitoba, Queens.
- Food processing: Manitoba.
- Agricultural systems: Guelph, Manitoba.

Three major initiatives undertaken by the International Development Research Centre (IDRC) were supported to promote *eco-regional* approaches to natural resource management in the Andes and the tropical hill sides of Latin America. Both of them involve the formation of Consortia of a wide range of institutions to address policy and technology interventions. They are supported by several other donors including the SDC, GTZ and the government of the Netherlands in the case of the Andean initiative and SDC and Ford in the case of the Hillsides program.

The main characteristics of the **Sustainable Andean Development Network** are:

- the pursuit of entrepreneurial approaches, and sharing of costs and benefits among participants;
- open and flexible participation according to interests and comparative advantages for agreed tasks;
- the intensive use of electronic means to increase the cost-effectively exchange of information, provide technical back-up and promote the benefit of meetings;
- support to a core group of highly qualified researchers from different institutions and sectors (agricultural production, marketing and processing, social and economic policies, environment and management of natural resources) while pursuing a systems/interdisciplinary approach to identify main constraints and support the development of viable alternatives;
- the use of funding mechanisms to promote creativity, competitiveness, and efficiency;
- the establishment of linkages between R&D, including the participation of bilateral development projects to amplify network efforts and create spill-over effects;
- institution-building by promotion of the development of human resources in sustainable development issues, methods and techniques;
- the promotion of inter-institutional concertation; and,
- the promotion of multidisciplinary research approaches on issues of sustainable development.

The **Sustainable Agriculture in the Hillsides** is allowing the operation of a Consortium of international organizations (CIAT, ICRAF, IFPRI, CATIE, and IICA), NGOs and national institutions to address watershed management problems in three locations in Central and South America by a highly integrated effort involving policy and technology research.

A global initiative on **Sustainable Highland Resource Management** was initiated with a meeting in the Philippines. It involved the participation of social and biological scientists from NGOs, national and international organizations working on that topic. A second meeting will take place in Nairobi in December 1993.

OTHER RELEVANT INTERNATIONAL SUSTAINABILITY-RELATED FORA

Other countries in which Canadian institutions have played a role in mountain eco-systems are:

Asia: ICIMOD, IRRI, IBSRAM.

Latin America: CIP, CATIE, CIAT.

Peru: FUNDEAGRO, IEP, Bartolome de las Casas, GRADE.

Bolivia: IBTA, CEBIAE, ILDIS

Colombia: U. de los Andes, FEDESARROLLO.

Ecuador: FUNDAGRO, INSOTEC, CAAP

Africa: ILCA, CIMMYT, ICRAF.

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United Nations Commission for Sustainable Development, Department of Policy Coordination and Sustainable Development, Room S-3060, United Nations, New York, N.Y. 10017, USA, tel (212) 963-5959.

LIST OF ACRONYMS

Asia: ICIMOD - International Centre for Integrated Mountain Development
 IRRI - International Rice Research Institute
 IBSRAM - International Board for Soil Research and Management

Latin: CIP - Centro Internacional de la Papa
 CATIE - Centro Agronomico Tropical de Investigacion y Ensenanza
 CIAT - Centro Internacional de Agricultura Tropical

Peru: FUNDEAGRO - Fundacion para el Desarrollo del Agro
 IEP - Instituto de Estudios Peruanos
 Bartolome de las Casas, GRADE

Bolivia:
 IBTA - Instituto Boliviano de Tecnologia Agropecuaria
 CEBIAE - Centro Boliviano de Investigacion y Accion Educativas
 ILDIS - Instituto Latinoamericano de Investigaciones Sociales

Colombia:
 U. de los Andes
 FEDESARROLLO - Fundacion para la Educacion Superior y el Desarrollo

Ecuador:
 FUNDAGRO - Fundacion para el Desarrollo Agropecuario
 INSOTEC - Instituto de Investigaciones Socio-economicas y Tecnologicas
 CAAP - Centro Andino de Accion Popular

Africa:
 ILCA - International Livestock Centre for Africa
 CIMMYT - Centro Internacional de Mejoramiento de Maiz y Trigo
 ICRAF - International Council for Research in Agroforestry

SDC - Sahel Documentation Centre or System Development Corporation
GTZ - Deutsche Gesellschaft für Technische Zusammenarbeit
IFPRI - International Food Policy Research Institute
IICA - Instituto Interamericano de Ciencias Agrícolas

*Planning for
a Sustainable
Future*

PROJET DE SOCIÉTÉ

ASSESSMENT OF
AGENDA 21
DOCUMENT AND INFORMATION
COMMITTEE

ÉVALUATION DE
L'ACTION 21
COMITÉ DE LA DOCUMENTATION
ET DE L'INFORMATION

TOWARD A NATIONAL
SUSTAINABLE DEVELOPMENT
STRATEGY FOR CANADA

VERS UNE STRATÉGIE NATIONALE
DE DÉVELOPPEMENT DURABLE
AU CANADA

THIRD NATIONAL STAKEHOLDERS ASSEMBLY
DECEMBER 16-17, 1993, OTTAWA, CANADA
TROISIÈME ASSEMBLÉE DES INTERVENANTS NATIONAUX
LES 16 ET 17 DÉCEMBRE 1993 À OTTAWA, CANADA



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