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1. Introduction: The aims of the Mountain Agenda

Mountain Agenda is an NGO initiative designed to draw the attention of governments and their policy advisors as well as the general public to the unsustainable exploitation of mountains, both in the north and the south, and to the neglect of the world's mountain heritage. The purpose is to start remedial action before it is too late. The best occasion is the world environmental stock-taking due at UNCED.

Mountain Agenda consists of a core of written presentations. One is long, attempting an environmental status report on the world's mountains; the second is shorter, condensing both the argument and the suggested action plan into an appealing, illustrated format; the third, of two pages, is essentially a manifesto.

The core presentation is a cooperative effort drawing on the knowledge and opinions of experts and concerned individuals from all over the world contacted through several international NGOs and the media.

In parallel with the documentary side is an open invitation to all concerned people, wherever they are, to participate in the initiative in their own way – holding public debate and meetings, making a TV film, writing articles and broadcasting – anything that will help prepare the ground so that action in Rio will bear fruit in the years to come.

The idea of using UNCED to publicize the mountain problematique came from a nucleus of people whose working lives have been concerned with development and environment in universities, governments and the UN. Their institutional provenance includes the UN University, the International Centre for Integrated Mountain Development (ICIMOD) based in Kathmandu and the network constituted by the International Mountain Society (IMS). They came together privately, encouraged by the Secretary-General of the United Nations Conference on Envi-

ronment and Development (UNCED). They see themselves as creating a channel for the efforts and concern of other people all over the world who care about the health of the mountains and the well-being of the people who live among them.

The results anticipated are as follows: First a wider and deeper awareness on the part of the global community of the threats to the mountains. Second the beginnings of a regular global audit of the condition of the mountain environment to provide a sound basis for management. Third international approval of a plan for immediate action to get the measure of the problems. Fourth the first authoritative report on the environmental and developmental condition of the world's mountains and their inhabitants.

The Governments of Switzerland and Germany as well as UNESCO provide the necessary financial and moral support to make possible the practical preparations for the Mountain Agenda – UNCED 1992.

2. Mountains as key elements of the global ecosystem

Mountainous and upland areas cover 20% of the earth's land surface, approximately 10% of the world's population live in mountain regions, but perhaps half of all humankind is dependent in some way on mountain resources, e.g. water, forest, agriculture, energy, mineral wealth, recreation, etc.

Many authors have attempted to define high mountains. However, the main problems of resource use and human impact relate not so much to the high mountains but rather to the middle and lower altitudinal belts where intensive land-use is possible. The simple and perhaps arbitrary approach of defining mountains to include all terrain that exceeds an altitude of 1000 m places a vast part of the earth's surface within this category (fig. 1). This definition is most certainly not adequate, yet it provides a gross indication of potential geomorphic energy, geological processes with erosion, hazards, limitations for land-use, accessibility, etc. (Messerli 1983).

Because of steep slopes, fragile soil and vegetation cover, the very diversity of the milieu renders mountains highly susceptible to environmental degradation, as well as climatic change (Ives 1991). Mismanagement of mountain land is setting in motion not only irreversible damage to the mountains, but very often actual and perceived devastation to the surrounding plains occupied by far larger numbers of people than those in the mountains themselves: Mountains are fragile ecosystems, they must be a major world-wide concern!

3. Water towers for mankind

According to statistics compiled by United Nations Institutions, South and East Asia soon will contain more than half of the world's population. The economy of this area depends upon the major rivers flowing south and east from the Himalaya-Karakorum-Pamir-Tibet high mountain region. Relatively minor disturbances

MOUNTAINS AND PLATEAUS IN THE WORLD
Altitude 0 - 200 m
Altitude 200 - 1000 m
Altitude above 1000 m

effect major changes on these river systems, including erosion rates in the mountains and flooding (e.g. India, Bangla Desh, China) or low water (e.g. Lake Aral) in the lowlands. Similar problems can be observed in the Andes. The hydrological regime of the upper Amazon, for instance, can be influenced by progressive deforestation. The potential danger of higher flood levels along the entire length of the Amazon is considerable (Gentry and Lopez-Parodi 1980). But also the tropical mountains of Africa, e.g. Mt. Kenya, are most important for a large surrounding area. Mountains – the water towers for expanding land-use and a growing population!

4. Forces on the forests

The situation of mountain forests world-wide is complex and varies from place to place. Greater understanding is necessary if sound and sustainable policies are to be put in place for development and conservation of mountains. In the tropical developing countries for the most part, the frontier of forest destruction is still inexorably moving up the mountains. It is driven by rapid population increase, uncertain land tenure, inequity in distribution of resources and lack of strong and stable institutions on the frontier (e.g. Ethiopia as a real tropical mountain country has only 3% of its surface covered by forests). Logging, fuelwood collection and slash-and-burn subsistence agriculture by a too dense population, land clearing for commercial agriculture, clearing or drowning for reservoirs, bulldozing for new mountain roads, felling for transmission lines or pipelines, harvesting forest game, grazing livestock, etc. are indeed negatively impacting the remaining mountain forests in almost all of the countries of the world. We must begin or continue with major programmes of forest conservation and forest restoration in the mountains of the world for a better life in the highlands and land-use in the lowlands (Hamilton 1991).

5. Biological diversity – our basic natural wealth

While the absolute number of species in mountain environments may be less than in the lowland tropical rain forest, the montane tropical rainforests, the mountain cloud forests, and indeed mountain wildlands in general, whether tropical or temperate, are the refuge for a great wealth of endemic and endangered species and communities. Mt. Kinabalu in Sabah for instance is estimated to have 4000 to 4500 plant species, more than one-quarter of all species in the USA. Much scientific and popular concern about mass extinction is focussed on 14 "hot-spot" areas in the tropics. Seven of these are either mountains or have at least half of their area in mountains. The uplands of Madagaskar, lower Andean slopes of western Amazonia, Eastern Himalayas (Nepal, Bhutan, India, China's Yunnan), the uplands of the Philippines, the eastern arc montane forests of Tanzania, India's western Ghats and the montane forests of Sri Lanka.

From the storehouse of mountains we have taken some of our most important current food staples. E.g. potatoes come to us from the Andes, coffee originally

from the Ethiopian highlands, the Sierra Manantlan in Mexico is the only known stand of the most primitive wild relative of corn or maize, high in the Caucasus mountains the Sovjet Union has established a reserve to protect the wild relatives of wheat and fruit trees. New technologies of genetic engineering have enhanced the value of our genetic storehouses, rather than reducing our reliance. The great wealth of biological diversity exists because of the great variety of environments in mountain areas. This variation is caused by rapid changes in elevation which results in rapid changes in temperature, light intensity, rainfalls and soils. We need to know more about these banks of biological wealth, and in this sense we have a responsibility for the uniqueness of these mountain treasures (Hamilton 1991).

6. Climate change and ecological fragility

Global warming will have a pronounced effect on mountain ecosystems due to the altitudinal zonation in a relatively short horizontal distance. Changes in the water balance (glaciers, snow cover, rainfall, etc.) and in the vegetation cover will influence not only the life supporting systems for the inhabitants of the mountains but also the resources for the densely populated plains (energy and water supply, irrigation systems, etc.). Mountain ecosystems have to be considered in future investigations as most sensitive indicators of the slightest changes, as it can be seen from the changes of the past. The same is true for the changes of the future. Mountains influence and determine the climatology and the circulation pattern from the local to the continental scale. Can we imagine the influence of the Rocky Mountains on the climatology of North America, the Andes on South America? Would northern India be an arid land without the Himalayas? Do we understand the influence of the Alps on the circulation in Middle Europe? Where would be the northern border of the Sahara without the North African mountains? Similar questions we have for the East African mountains, the West Pacific Rim, etc. All this means that mountains are not only steering elements in the general circulation but they reflect also the smallest changes in the circulation pattern and in the climatological conditions, due to the sensitivity of the mountain ecosystems and ecotones. We need these key areas for short-term observations and for long-term monitoring!

7. The draw of the plains

The situation in the mountains has undergone rapid changes in the recent past, especially since the widespread extension of mechanically powered transportation systems and the use of road and bridge building technologies. The uses of new transportation facilities were, however, predominantly determined by the interests of the plains. In this way, while the spatial marginality of the mountains got reduced, new marginalities emerged. One of them lies in the fact that the mountains are more integrated to the economy of the plains. With the enhanced acces-

sibility to the mountains, the economies of the plains have better knowledge about and easier access to the rich natural resources of the mountains, such as hydropower, minerals or timber.

Thus, the roads often are forerunners to the extraction of minerals in the Andes or forests in the Himalaya or water in the Alps or commercial farming in the African mountains. When the plains need cheap human resources from the mountains, the transportation system quickly makes them available. The relationship between the two is characterised by unequal terms of trade and enhanced dependence of the mountains on the market in the plains. This new socio-economic marginalization of the mountain areas is the result of their unequal economic integration into the larger economy of the plains.

The new forms of marginalization of the mountains, political and socio-economic, have reinforced each other and often lead to enhanced inequities and environmental degradation in the mountains. The natural resources of the mountains, following political integration, are often managed through state planning in ways that are advantageous to the economy of the plains (Bandyopadhyaya 1991).

8. Growing dangers

Because of political and socio-economic marginality, fragmentation of jurisdiction among nation states, and because of steep slopes and fragile vegetation cover, the very diversity of the milieu renders mountains highly susceptible to environmental degradation, as well as climatic change.

Mismanagement of mountain lands and mountain people is setting in motion not only irreversible damage to the mountains, but actual and perceived devastation to the surrounding plains where live populations far larger than those in the mountains themselves.

Global warming and climatic change will likely have immediate repercussions in the mountains in terms of the availability of water and hydro electricity for the surrounding lowlands, the shifting of vegetational belts and thus surface reflectance, the success or failure of winter recreational investments to name only a few.

These problems are rendered all the more intractable simply because insufficient knowledge is available on which to base appropriate counter measures. As an example, it is still not really known to what extent mismanagement in the mountains is related to catastrophic flooding in the plains below. There is suspicion, doubt and tension. The dangers of inadequate, wasteful or even counter productive measures will remain until uncertainties can be either replaced by sound knowledge or recognized as such.

It is both remarkable and unacceptable that mountains and mountain people should remain deprived of their rightful high priority position in the world environmental agenda. Just as certainly as water flows down the mountainside so catastrophic consequences will flow from continued neglect.

9. Potentials and chances

Fortunately, the complex interlinkages between ecology and development not only work in the negative sense but can operate very positively. An example for this is mountain agriculture. Detailed measurements in many mountain areas have shown that water run-off from slopes and flooding in the valley bottoms heavily depend on the management of land resources. Dense forests, as an example, reduce run-off as compared with pasture or bush lands. But – and this is the crucial point – well-kept irrigation terraces will secure the mountain hydrology at least as well as forests, sometimes even better! This means that a well-developed mountain agriculture system is the best precondition for a sound mountain environment. This will, in its turn, be one of the most important preconditions for a better economic development. There is, no doubt, much positive interconnection between restoring or preserving the mountain environment and new development potentials for the mountain people. The promotors of Mountain Agenda – UNCED 1992 are convinced that new concepts of sustainable mountain development can be developed, if field experts closely cooperate with farmers, decision-makers with scientists and government institutions with NGOs. The dangers are great but the chances are bigger than the world may think.

10. An appeal for action

During the Preparatory Conference for UNCED held in Geneva in August, 1991, the delegation of Switzerland drew the attention of Working Group I to the problems and potentials of the world's mountains. The Swiss delegation referred to the efforts undertaken by the Mountain Agenda Group and invited the UNCED Secretariat to continue its cooperation with ICIMOD, UNU and IMS. More specifically, the Swiss invited the Secretariat to work out – in close contact with the three institutions – practical proposals for Agenda 21 with the following goals:

First: Strengthening those national and regional institutions concentrating their effort on mountain environment and sustainable mountain development. The eight countries of the Himalayan region have already joined forces in creating ICIMOD, the International Centre for Integrated Mountain Development. Similar efforts should be encouraged and supported in other parts of the world, particularly in Africa and Latin America.

Second: Creation of mechanisms permitting the sustained cooperation and information exchange between all these national and regional institutions, so as to promote a mutual learning process and effective action towards sustainable mountain development.

Third: Encouraging scientific institutions and governments of industrialized countries to extend their cooperation to the institutions promoting sustainable develop-

ment in the mountains of the world. Without their support and funding, progress towards such development will not be sufficient.

The response to the Swiss proposal was very encouraging. 17 other delegations, mainly from Asia, Africa and Latin America speaking after Switzerland were underlining the importance of mountain environment and development. Many referred explicitely to the Swiss proposals and endorsed them. By the end of the PrepCom, decisions were taken concerning more concrete recommendations to be included in Agenda 21. The chances for the world's mountains to receive due attention in Rio in 1992 have thus considerably increased.

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