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Adapting the Management of Mountain Forests to New Environmental Conditions

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International Partnership for Sustainable Development in Mountain Regions (IPSDMR)

First Global Meeting of Members in Merano, Italy, 5–6 October 2003

The International Partnership for Sustainable Development in Mountain Regions (IPSDMR) was initiated by the Government of Switzerland, the Food and Agriculture Organization (FAO), the United Nations Environmental Program (UNEP), the Government of Italy, and the Mountain Forum (MF) during the International Year of Mountains 2002 (IYM2002). The concept of the IPSDMR originally took shape during sessions of the Preparatory Committee for the World Summit on Sustainable Development (WSSD) and was finalized—with the publication of a basic concept document—at the 4th session of the Preparatory Committee in Bali, Indonesia, in June 2002. The Partnership was officially adopted as a "Type 2 Outcome" at the WSSD in Johannesburg, South Africa, 26 August 2002–4 September 2002. Activities so far in 2003 have included several meetings in Switzerland, an e-consultation moderated by the MF, and a side event at the meeting of the Commission on Sustainable Development (CSD-11) in New York. These activities culminated in the First Global Meeting of Members of the Mountain Partnership, held in Merano, Italy, 5 October 2003–6 October 2003.

Broad membership

To date, more than 75 countries, intergovernmental organizations, and major groups have joined the IPSDMR. The Partnership is committed to mountain-specific goals of the WSSD, with the aims of sharing knowledge and experience and promoting cooperation among its members. The First Global Meeting took place at the invitation of the Italian Government and featured participants from every part of the world. The Meeting commenced with a dinner in Verona on 4 October, followed by 2 days of plenary sessions and debate in Merano. Key opening statements and remarks were delivered on the first day by the Italian Minister of Foreign Affairs, the Italian Minister of Regional Affairs, the Deputy Director-General of FAO, and the Deputy Director-General of the Swiss Agency for Development and Cooperation (SDC). This was followed by remarks by speakers from mountain organizations, which terminated the first day's plenary session. Several representatives of governments and nongovernmental organizations participated in the debate session following the plenary session, to complete the first day's work.

Exploring the structure and themes of the IPSDMR

The plenary session on the second day opened with a keynote address by Gabriel Campbell, Director-General of the International Centre for Integrated Mountain Development (ICIMOD) and Chairperson of the MF. Gabriel Campbell enumerated the key questions facing the new Partnership, including practices and procedures, structure, equality of treatment among partners, and assurance of adequate attention to the poor in mountain regions. He then summarized the results of the e-conference held in April 2003 to gather input from Partnership members. One important theme in this respect was the possibility of establishing goals similar to the UN Millennium Goals (cutting poverty in mountain areas by one half, providing payment for environmental services in mountains, ensuring greater upstream–downstream equity, etc.). This presentation was followed by speakers representing, among others, the Government of Peru, the United Nations Educational, Scientific, and Cultural Organization (UNESCO), the United Nations Convention to Combat Desertification (UNCCD), the Consortium for the Sustainable Development of the Andean Ecoregion (CONDESAN), and the Mountain Environment Protection Society of Iran. In addition, Afghan Environment Minister Ahmad Nuristani made a plea for development work in his war-torn country. This cross-section of organizations and points of view inspired numerous interventions from the floor, which were delivered in the follow-up debate session.

The final plenary session consisted of a Chairman's summary given by Gabriel Campbell, a brief debate, and a final Adoption of Conference Conclusions. In his Chairman's summary, Gabriel Campbell proposed that the Partnership should consider the following themes as truly appropriate for its attention:

- Poverty.
- Conflict.
- Biodiversity.
- Culture.
- Indigenous knowledge.
- Payment for services in mountain regions.

He raised the question of whether targets per se are desirable, and he pointed out that building on the wealth of available skills in the Partnership, addressing poverty, promoting North–South exchange to deliver benefits to and communicate with local people, fostering research for development, and monitoring and propagating success stories were all activities that would support WSSD goals.

The Conference Conclusions adopted at the end of the conference reaffirmed commitment to the

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Partnership on the part of the members present. Members agreed to promote the Partnership's innovative, transparent, flexible, participatory, and dynamic character and to

> pursue the objective of fostering actions at all levels to protect mountain environments and support mountain livelihoods through the integration of the environmental, economic and social components of sustainable mountain development.

Participants mandated the existing open-ended Task Force established to prepare the Merano meeting to work toward complete establishment of the Partnership, and to report to the members by the next meeting of the CSD. The Task Force will define criteria for membership, examine the issue of future governance of the Partnership, and define ways to allow the Partnership to help promote joint initiatives based on Paragraph 42 of the Johannesburg Plan of Implementation.

Future tasks and *Mountain Research and Development's* commitment

The First Global Meeting confirmed and officially established the Partnership. Much work will have to be done in the coming year, before the Second Global Meeting envisioned for 2004. *Mountain Research and Development* (*MRD*), represented at the First Global Meeting by its managing editor, expects to be an active member of the Partnership. Discussions during the meeting with members and potential members of the *MRD* network proved very fruitful. Potential directions for further collaboration between *MRD* and MF, as well as *MRD*'s relations with members of the International Mountain Society (IMS), were explored. The value of *MRD* as a mountain journal within the MF network and beyond was clearly reaffirmed in informal discussions. Hence, one important outcome of the First Global Meeting for the *MRD* editorial team was reinforcement of its own optimism about the future of the journal and the Partnership.

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Adapting the Management of Mountain Forests to New Environmental Conditions

Research Results and Needs in Austria, Presented in April 2003 in Vienna

Intergovernmental action to protect forests in Europe

Four conferences of the European Ministers of Forestry have addressed the role of forests as an important economic factor to date, stressing their significant contribution in protecting human settlements and infrastructure against natural hazards and providing benefits such as recreation and preservation of ecological diversity. They also focused on protection of the forest heritage. The First Ministerial Conference on the Protection of the Forests in Europe took place in December 1990 in Strasbourg, France, as a common initiative of France and Finland. Because of concern about "forest dieback," cross-border protection of European forests was discussed for the first time at the ministerial level.

The ministers responsible for forestry committed themselves to technical and scientific cooperation and signed a declaration of principles and Strasbourg Resolutions S1–S6. This initiated the Pan-European Process for the Protection of the Forests, continued in Helsinki, Finland, in 1993, with the outcome of the debate laid down in Resolutions H1–H4, taking into consideration measures agreed to at the UN Earth Summit in Rio de Janeiro, Brazil. Within the framework of the Third Ministerial Conference, which took place in June 1998 in Lisbon, Portugal, a General Declaration was adopted, and Resolutions L1 and L2 were signed. Europe has thus reinforced its willingness to promote and safeguard the various ecological, economic, cultural, and social benefits of forests on a sustainable basis.

A working document was designed to implement Resolution S4, "Adapting the Management of Mountain Forests to New Environmental Conditions." At an International Workshop in May 2000 in Igls/Tyrol, Austria, named The Sustainable Future of Mountain Forests in Europe, the Federal Office and Research Centre for Forests and the University of Agricultural Sciences in Vienna, Austria, presented research results and needs, followed by a list of demands for harmonized action and sustainable management of forests at the European level. The findings were presented at the Fourth Ministerial Conference held in April 2003 in Vienna for the preparation of further resolutions regarding international forest policy.

European mountain forests: a special concern

Sixty-seven percent of Austria's territory fits the European Union definition of "mountainous area," and nearly half of Austria's 2351 communities live and work in this area. Thus, it was very important for Austria that the ministers agreed in Lis-

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bon to promote implementation of commitments made previously within the framework of the ministerial conferences in Strasbourg and Helsinki, in collaboration with international bodies and organizations. For this reason continuation of the implementation of Resolution S4, "Adapting the Management of Mountain Forests to New Environmental Conditions," was endorsed, and the newly established European Observatory of Mountain Forests (EOMF) was charged with the preparation of a working document for the European Mountain Forests Action Plan (EMFAP), designed for the implementation of Resolution S4.

Reviewing research and research needs in Austria

The Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management entrusted the Federal Office and Research Centre for Forests with the compilation of research results and research needs relating to the theme of the workshop in Vienna, taking into account two of the topics formulated in part I/10 of Resolution S4:

- Determination of geographical units by identifying and studying all environmental factors.
- Production of ecological maps at the valley and catchment level, including data on environment and risks.

The sustainability of mountain forests can be evaluated using standardized methods applied to an entire national territory and within regional studies. The state of knowledge of risk factors and necessary steps to be taken to improve understanding of the economic and ecological interactions is the basis of further national and international cooperation in the fields of science and policy.

Austrian knowledge that may contribute to sustainable management of forest ecosystems at the European level as well as to adaptation of mountain forest management to new environmental conditions is briefly summarized below. This overview was prepared in cooperation with the Institute of Silviculture of the University of Agricultural Sciences in Vienna. Mountain forests are defined as forests in the montane and subalpine zones of the Alps, in accordance with COST Action E3 (COST: European Cooperation in the field of Scientific and Technical Research) on the role of forests in protecting rural mountain areas.

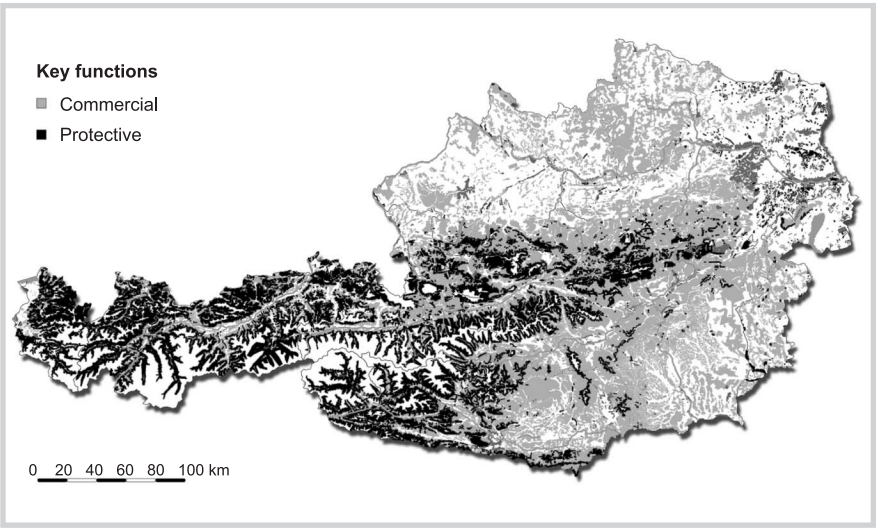

FIGURE 1 Key functions according to the Forest Development Plan. (Bundesministerium für Land- und Forstwirtschaft, 1999)

Determination of geographical units by identifying and studying all environmental factors

Classification according to "forest growth areas and altitudinal levels" (Kilian et al 1994), "criteria of naturalness" (Koch 1999), and "key functions of forests" (Bundesministerium für Land- und Forstwirtschaft 1999) constitutes a planning instrument and is the basis for economic development, landscape and environmental planning, conservation, and forest policy decisions and measures at the national and federal levels. The following research needs were identified:

- Refinement of growth area classification—especially for sensitive regions at a scale between 1:10,000 and 1:50,000—as a basis for environmentally sound planning and designing of corresponding management and protection measures.
- Establishment of a map or a manual of the potentially natural forest communities (PNFC) in Austria. A compilation of all existing maps and their transfer into a useful forest association nomenclature, as well as the development of methods for the production of PNFC maps from available local information (eg, hemeroby study, Austrian Forest Inventory, natural forest reserves, Austrian Forest Soil Survey) using geographic information system technology.
- Identification of Austrian torrent catchment areas according to a unified classification.

Production of ecological maps at the valley and catchment level including data on environment and risks

Table 1 summarizes the available national and regional maps of environmental and risk factors. The ecological maps are the basis for enhancing understanding of ecological and economic interrelations. The risk maps provide a basis for further national and international

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TABLE 1 National and regional maps of environmental and risk factors in Austria. The full references are listed in Kudjelka et al (2000).

National maps	Regional maps
Maps based on Austrian soil protection concepts (Bundesamt und Forschungszentrum für Landwirtschaft 1997)	Hazard zone maps, Decree on Hazard Zone Planning (1976, Federal Law Gazette 436/176)
Forest soil condition maps (Forstliche Bundesversuchsanstalt 1992)	Forest site maps (Englisch and Kilian 1998)
Maps based on the Austrian Forest Inventory (Schieler et al 1995; Forstliche Bundesversuchsanstalt 1997)	Vegetation maps (Schiechtl and Stern 1995)
Map of natural forest reserves (Parviainen and Frank 2003)	Nitrogen input maps (Knoflacher and Loibl 1998)
Map of the geographic distribution of genetic structures in tree populations (Geburek 1999)	Forest soil condition map in the countries of the ARGE Alp and ARGE Alpen Adria (Huber and Englisch 1997)
Pollutant impact and risk maps (Fürst et al 2003)	Forest soil condition maps for Tyrol (Amt der Tiroler Landesregierung 1988, 1991).
Maps of proton and nitrogen input (Mutsch and Smidt 1994; Knoflacher and Loibl 1993), ozone impact (Loibl and Smidt 1996), and heavy metal input (Herman et al 2001)	Maps based on remote sensing (Gärtner 2001)

political measures and scientific activities. The following research needs were identified:

- Refinement of the maps showing critical levels and critical loads for regional assessment.
- Risk assessment of N-input, concerning drinking water resources and transit regulations.
- Modeling of risk due to climate change for the main tree species in Austria.
- Establishment of limiting values for heavy-metal content in forest soils.

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Management of High-Mountain Forests in the Western Carpathians, Slovak Republic: Research Results and Perspectives

Characteristics of forests in the spruce vegetation zone

The Slovak Republic is one of the most forested countries in Europe. Forest covers about 20,000 km^2 (41%) of the total area of the country, a substantial part of which is occupied by the mountains of the Carpathian Arch (highest peak: Gerlachovsky Peak, 2655 m). Forests in Slovakia have commercial functions as well as functions of benefit to the public: timber production, water management, soil erosion control, avalanche control, nature conservation, tourism, and aesthetic value. Many rivers that are important for neighboring countries spring from the Slovak mountains; Slovakia is therefore sometimes called the roof of Central Europe.

All forest ecosystems found in the spruce vegetation zone are protective forests. The most important forest ecosystem in terms of benefit to the public is spruce forests, located at an altitude of 1250–1550 m in the so-called spruce vegetation zone (SVZ). In this zone, total annual precipitation ranges between 1000 and 1300 mm, mean annual temperature ranges between 2°C and 4°C, and the vegetation period lasts 70–100 days. The SVZ forests cover about 40,000 ha or 2% of the total forest area and are located in the central and northern parts of the country, some of them in national parks.

The original SVZ forests were made up mostly of sparse stands or groups of trees with Norway spruce as a dominant species. Some forests also have European larch, Euro-

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FIGURE 1 The Tatra National Park has many natural mountain pine stands and abundant glacial lakes (here, Popradske Lake). (Photo by Bohdan Konôpka)

pean beech, mountain ash, and individual stands of dense mountain pine. Silver fir, cembra pine, and sycamore maple can also be found. The most frequent forest-type groups (original species composition before human influence) are Sorbeto-Piceetum (mountain ash-spruce) and Lariceto-Piceetum (larch-spruce).

Main problems in the SVZ

Research into forest ecosystems in the SVZ (also referred to as high-mountain forests) has mainly focused on the decreasing health of trees. Monitoring of forest health in certain areas within the SVZ showed that about 90% of SVZ forest can be considered to be affected by air pollution. The typical situation involves a low air pollution level, with existing growth conditions allowing spruce trees to survive about 60 more years. A rise in ozone concentration with altitude has been proven within the SVZ. Furthermore, a significant decrease of soil pH values was recorded (0.5–1.0 unit since the 1960s). Although sulfur and nitrogen emissions were considerably reduced during the past decade, these substances are still accumulated in the soils.

Another negative ecological factor significantly influencing the health of high-mountain forests, especially in the last 2 decades, is unfavorable climatic conditions (lack or unsuitable distribution of annual precipitation, temperature extremes, etc). Formerly, the Slovak high-mountain forests were considered to have sufficient precipitation and favorable soil moisture. However, recent studies showed a dramatic change in the water regime in mountain forest soils, especially in sparse spruce stands. Soil acidification and lack of soil moisture are considered the most negative factors—worsening, or on some sites even disabling, natural regeneration of high-mountain forests.

In addition, these forests have been seriously damaged by storms. Trees damaged by wind or physiologically weakened by climatic extremes create favorable conditions for bark beetle outbreaks. Whereas in the past such outbreaks occurred only up to 1000 m, presently this limit is at 1300 m and in certain areas even at the timberline. All these factors cause weakening or even collapse of forest ecosystems. Forest stands become sparse and fragmented. This phenomenon is most evident on mountain ridges at 1300–1600 m.

Recent research efforts

Studies located mainly in the Tatra National Park (Figure 1) have explored the possibilities of restoration (through reforestation) of mountain pine stands that had been reduced by livestock grazing in previous centuries. Further research has focused on reclamation measures such as liming and fertilizing in spruce forests weakened by air pollution or other agents. Since 1999, a 4-year research project at the Zvolen Forest Research Institute has been studying methods for high-mountain forest management based on principles of sustainable development. The project is financed by the Slovak Ministry of Agriculture and is the largest project in the history of Slovak forestry.

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TABLE 1 Basic forestry decisions per forest class according to degree of naturalness.

"Naturalness" class	Function	Silvicultural system	Rotation (years)	Regeneration period (years)
1st: Primeval forest	Protective	Retained for self-regulating processes without intervention	250–300	Continual
2nd: Natural forest	Protective	Shelterwood system but mostly retained for self-regulating processes without intervention	200	Continual
3rd: Man-made forest	Protective	Shelterwood system	150	Continual

Main outputs of the Zvolen research project

Until now, the project has consisted of 6 subprojects on the following topics:

- Ecological change in forest environments and its influence on the functional potential of high-mountain forests.
- Silvicultural methods in high-mountain forests based on principles of sustainable development.
- Protection of high-mountain forests against main kinds of harmful agents.
- Research on and development of methods, techniques, and technologies for silviculture and harvesting in high-mountain forests.
- Efficient management of high-mountain forests.
- Planning and management in high-mountain forests using ecological approaches.

The results from the first 5 subprojects have been synthesized and used to elaborate planning and management principles for high-mountain forests (ie, the sixth subproject), covering the following issues: basic management decisions, desired tree species composition, desired stand structure, target stocking, and management principles.

Basic management decisions

Basic decisions in the Slovak forest management practice concern forest category (commercial, protective, special purposes), silvicultural system (clear-cutting, shelterwood, selective cutting), rotation, and regeneration period. Basic decisions were elaborated for 3 classes—primeval, natural, and man-made forests—that reflect the intensity of human influence on the forest ecosystems (Table 1).

Desired tree species composition

Both in the original (primeval) and in current high-mountain forests, Norway spruce is the dominant species. It tolerates the harsh living conditions in the SVZ better than all other species. Other species have been proposed depending on the site and climatic conditions, with the main aim of ensuring the forests' public-benefit functions.

Desired stand structure

The threshold values of selected indicators for desired stand structure were derived from data collected on research plots classified in the first class (primeval forest). They characterize the most original SVZ forest stands and were therefore considered as a benchmark for the desired stand structure. Primeval forests have 3 development stages—growth, maturity, and decline—characterized by adjusted average values of the following indicators: degree of diameter dispersion (to assess tree diameter variability); share of canopy level (to assess tree height variability); ratio between crown length and tree height, and tree height and tree diameter; and mosaic of stand clusters.

However, it will not be possible to reach the desired stand structure even in the next generation because of large areas of artificially formed stands where management has been neglected. The characteristics of a realistic target stand structure were therefore derived from the data representing the second degree of naturalness (natural forest).

Target stocking

Target stocking was derived on the basis of an original procedure that takes into account requirements related to soil and water protection, stability, and natural regeneration. Relationships between stocking, indicators of stability, and preconditions for natural regeneration were analyzed. Combining these aspects, the value of 0.7 (0.6 at the upper forest limit) proved optimal for stand stocking.

Management principles

In a large area of the SVZ the objective of forest management is restoration, improvement, or maintenance of the forest's self-regulating abilities. To achieve this goal, functionally effective stand structures need to be formed. The more the stand structure approaches the status of primeval or natural forests, the better these forests are able to develop through internal self-regulating processes. Restoration or improvement of the self-regulating abilities of these forests also has great economic significance: the higher the forest's self-regulating ability, the fewer the management interventions that will be needed and the more effective the performance of forests' public-benefit functions.

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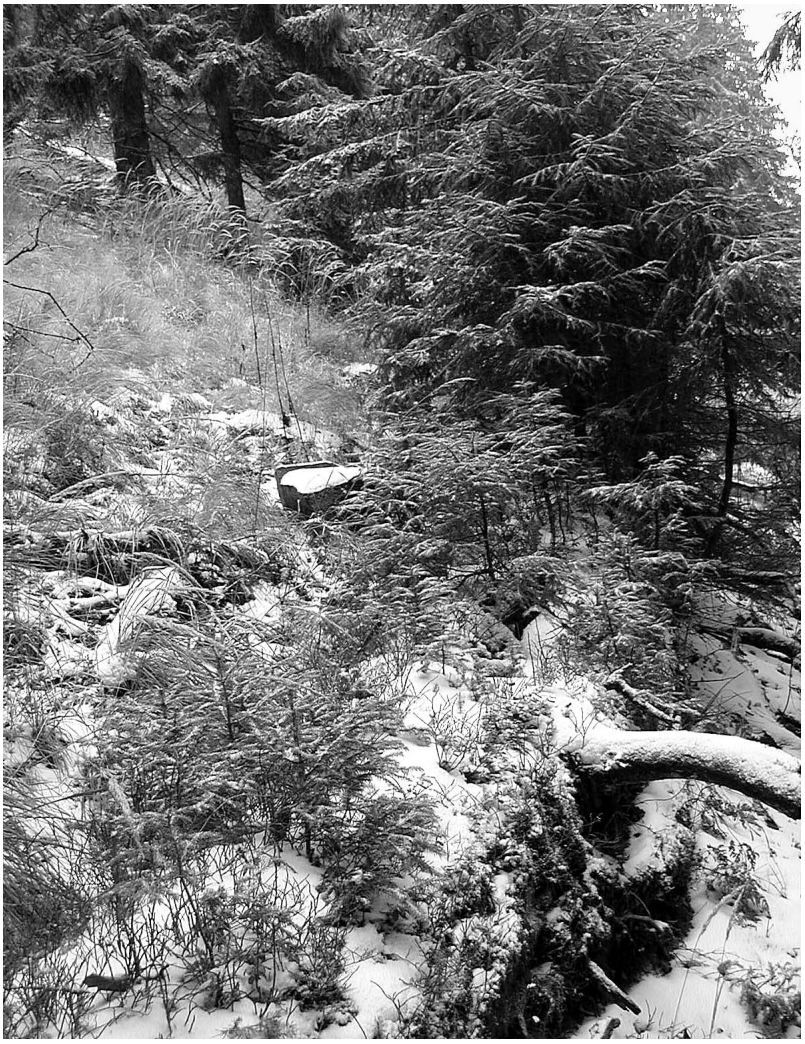
FIGURE 2 Natural regeneration in high-mountain spruce stands often occurs only on partly decomposed wood containing sufficient water and nutrients and is therefore a slow process. (Photo by Bohdan Konôpka)



Recommendations

With this in mind, we propose to plan and carry out any measures in these forests only on the basis of their actual "naturalness" class, which has to be the decisive criterion for determining the urgency of proposed measures. Additional criteria should include an assessment of static stability, natural regeneration, health condition, and stocking, as an indicator of fulfillment of ecological functions (mainly soil and water protection).

Basically, it can be stated that the forest stands classified in the first "naturalness" class can be left as is. In such stands, natural regeneration usually fully corresponds to the actual stand structure, and both static stability and health condition are excellent. Forest stands that do not meet these criteria—mostly man-made, even-aged, vertically and horizontally little-differentiated forests, but also natural forests with various development stages whose natural regeneration ability is insufficient—require concrete measures. These measures can be classified according to the degree of urgency, based on the forest's actual status.

Perspectives for the future

Better management of high-mountain forests will require building a comprehensive net of forestry roads that are ecologically adapted to the terrain. It will be necessary to adapt all forestry activities in high-mountain forests to ecological standards and to introduce the most recent techniques and technologies. Clearcutting is forbidden in the SVZ and has been fully replaced by shelterwood and selection systems. On sites with deteriorated soils, recovery measures such as area-wide application of dolomitic limestone by airplane or helicopter, addition of dolomitic limestone and NPK fertilizers in holes, or application of mulching cloths when planting will create suitable growth conditions for subsequent forest stands.

Generally, natural regeneration is preferable (Figure 2). However, on certain sites tree species diversity will be enhanced by planting desired tree species. Mixed stands (especially of Norway spruce, European beech, silver fir, Scots pine, sycamore maple, European larch, and mountain ash) will gradually substitute pure spruce plantations, thus enhancing the ecological stability of the forests (including resistance to ongoing climatic change). The health status of forests and occurrence of harmful agents will continue to be monitored. In the field of forest protection, preventive methods will be given preference over suppressive methods.

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International Conference on Himalayan Biodiversity (ICHB–2003), 26 February 2003–28 February 2003, Kathmandu

Conserving biodiversity: a global priority

Biodiversity is a global endowment of nature. Conservation of biodiversity includes all species of plants, animals and other organisms, the range of genetic stocks within each species, and ecosystem diversity. Food, many types of medicine, and industrial products are provided by the biological resources that are the basis of life on Earth. The value of the Earth's biological resources can be broadly classified as direct and indirect. Consumptive and productive uses are direct values, whereas nonconsumptive uses and options for the future constitute indirect values. One of the most fundamental direct benefits of biological resources is in providing the world's food. Wild species have also provided many of our medicines.

Ensuring conservation of biodiversity is one of humankind's important global responsibilities. Consequently, biodiversity has become a growing concern of central significance to all sectors of society. In Chapter 13 of Agenda 21, adopted at the United Nations Conference on Environment and Development (UNCED 1992), mountains are defined as "storehouses of biological diversity and endangered species." This great wealth of biological diversity is attributed to the wide variety of environments in the mountains, particularly the Himalayas.

Hence, UNCED gave biodiversity an important place on the agenda. Over 150 states have now signed the Convention on Biological Diversity (CBD), which entered into force at the end of 1993. By 1994, several countries from Asia and Pacific had ratified the Convention. Nepal was the 34th nation in the world and the 14th nation in the then Asia–Pacific region to ratify the Convention, on 23 November 1993. The Convention is a framework agreement that allows individual countries to determine how most of its provisions are to be implemented.

> The Himalayan region is the largest, highest, and most populous mountain chain in the world, and it is one of the world's richest ecosystems in terms of biological diversity. Extreme variations in altitude, aspect, geology, and soils over short distances have resulted in a wealth of natural ecosystems. The Himalayas are home to hundreds of endemic plant species and some of the world's rarest wildlife species. These rich biological resources have traditionally served as the foundation for the economic and cultural life of mountain people.

Human beings use the environment heavily. Projected population growth and economic activity will mean loss of biodiversity at a greater rate. Although biological resources are renewable, their overuse is usually associated with loss of biodiversity. Among the major threats are overexploitation of forest and vegetation resources for fuel, fodder, manure, grazing, fishing and hunting, expansion of agricultural land for an ever-increasing population, and the practice of slash-and-burn agriculture in mountain regions.

Biological resources are deteriorating rapidly throughout the world, primarily because of unsustainable approaches used in human activities, leading to the following changes and potential impacts:

- A decline in biological diversity, as evidenced by accelerating extinction of species and the destruction, modification, and fragmentation of habitats and ecosystems at all scales.
- A decline in the health and functioning of ecosystems, as evidenced by biodiversity loss, degradation of air and water quality, and loss of soil.
- A decline in the quality of human life, as evidenced by increasing world poverty, disparities of wealth, and particularly conflicts over natural resources.

Against this background, the Himalayan Resources Institute (HIRI), the Biodiversity Research Group (BRG) of the Central Department of Zoology (Tribhuvan University), the Ecological Association of Nepal (ECOAN), and the Nepal Biotechnology Association (NBA) organized an International Conference on Himalayan Biodiversity (ICHB-2003) from 26 February 2003 to 28 February 2003 in Kathmandu, Nepal, on the occasion of the International Year of Mountains (IYM2002) and the International Year of Ecotourism. The International Centre for Integrated Mountain Development (ICIMOD), the Asia Network for Sustainable Agricultural Bioresources (ANSAB), the Himal-Asia Cultural Heritage and Educational Foundation, the Nepal Tourism Board (NTB), and other national and international organizations supported the conference.

Objectives

The conference on "Conservation of Himalayan Biodiversity for Human Welfare" drew international attention to conservation and sustainable management and use of biological resources. The conference brought together various related aspects such as education, research, development, policy, production, processing, marketing, economics, energy, and environment and established an International Network for the Conservation of Himalayan Biodiversity in the Himalayan region. The following major topics were covered: Himalayan Flora and Fauna; Biodiversity Conservation; Indigenous

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Knowledge of Biodiversity Conservation; Trade-Related Intellectual Property Rights (TRIPs); and Ecotourism. The specific objectives of the conference were to:

1. Identify the major issues and options in biodiversity conservation in the Himalayan region.
2. Share ideas on recent biodiversity conservation and management approaches.
3. Review existing government policies and extension programs of the Hindu Kush–Himalayan (HKH) countries and explore regional cooperation for effective implementation of biodiversity strategies and action plans.
4. Develop an international network for Himalayan biodiversity conservation to exchange information and technologies at local, national, regional, and international levels.

The need for research and action

The conference was attended by more than 200 research scientists, technical specialists, and resource managers involved in various issues related to Himalayan biodiversity, representing more than 50 national and international organizations. Over 150 technical papers covering various fields of Himalayan biodiversity were presented by more than 50 national and international organizations and institutions from abroad.

The participants at the conference recognized that:

- The Himalayan range is a unique chain of mountains with fragile ecosystems and high endemic, rare, and endangered species of wild flora and fauna that fulfill basic daily needs for millions of people living in mountains and plains.
- These mountain ecosystems are largely neglected and are greatly threatened by human pressure.
- Exploration of flora and fauna and their habitats and mechanisms for maintenance of biological diversity are inadequate at present.
- Degradation and loss of biological diversity are at high levels.
- Appropriate approaches needed to address these issues are lacking, but recent developments (eg, large-scale conservation) appear positive.
- Traditional practices (forestry, agriculture) and indigenous technology are disappearing.
- There is a lack of coordination and communication among scientists and a lack of partnership among scientists, planners, and managers.
- A comprehensive Red Data Book is lacking.
- There is a need for habitat mapping using geographic information systems and global positioning system techniques.
- There is a lack of appropriate teaching curricula and infrastructure and research capabilities in the area of biotechnology to assign and use biodiversity for the betterment of society.

As a result, the conference passed a series of resolutions in the ICHB-2003 Declaration.

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Kathmandu Declaration of the International Conference on Himalayan Biodiversity

- Realizing the lack of effective implementation of earlier conventions and treaties (such as CBD, Kyoto, Johannesburg), this conference strongly demands that nation states in the region incorporate/translate the provisions of treaties and conventions into national legislation.
- This conference strongly recommends the creation of a Himalayan Biodiversity Database for the long-term research and monitoring of natural resources for sustainable development, including human dimensions.
- Realizing the rapid depletion of biological resources and the indigenous knowledge system (IKS), this conference strongly recommends the meaningful participatory biodiversity conservation approach based on indigenous knowledge.
- Realizing that mountain ecosystems are fragile and unique repositories of immense biological and cultural diversity, this conference recommends that the international community pay special attention to the conservation and sustainable development of these mountain ecosystems and cultural landscapes.
- Recognizing the lack of coordination and communication among the scientific community and institutions involved in Himalayan biodiversity conservation, this conference strongly recommends the establishment of institutionalized networking among policymakers, scientists/researchers, and institutions.
- This conference strongly recommends that the World Trade Organization respect the CBD, particularly by protecting the rights of the communities and farmers who are the true custodians of biological diversity.
- This conference opposes the extension of an intellectual property rights (IPR) regime specifically patenting life forms and genetic processes, which are the creation of millions of years of natural evolutionary processes.

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Some Mountain Action at the World Parks Congress in Durban

The 5th World Parks Congress of IUCN was held in Durban, South Africa, 8–17 September 2003. The theme of "Benefits Beyond Boundaries" attracted around 3000 participants from all over the world who are concerned with Protected Areas issues. It was announced at the gathering that, on paper at least, 12 percent of the terrestrial surface of the earth is now under some kind of conservation status. Information on the Congress is available at www.iucn.org/themes/wcpa/wpc/2003. A summary report was prepared by the International Institute for Sustainable Development (www.iisd.ca/linkage/sd/worldparksv).

A pre-Congress "Mountain Protected Areas Workshop" was held from 5 to 8 September in the Drakensberg at Didima hutted camp, Cathedral Peak. It was organized by WCPA Mountain Theme Vice-Chair Larry Hamilton and Deputy Vice-Chair Graeme Worboys. The hosts, Ezemvelo Kwazulu/Natal Wildlife under the guiding hand of Kevan Zunckel, provided a top-notch field program in the uKhahlamba/Drakensberg World Heritage Site. It featured visits to ancient rock art shelter caves, a community development project, and wilderness area management, and included a climb for peace to the Sentinel and Amphitheatre peaks on the Lesotho/South Africa border. Here members of the workshop displayed national flags and joined in affirming a Didima Declaration on Transboundary Cooperation and Peace.

Sixty mountain women and men from 23 countries participated in the Workshop. From evening working sessions there will emerge:

- An updated, heavily revised IUCN publication "Guidelines for Mountain Protected Areas;" this will be produced by Larry Hamilton and Linda McMillan of the American Alpine Club.
- A collection of approximately 50 papers edited by Graeme Worboys and David Harmon of the George Wright Society; it will be published by Andromeda Press.
- A revision of the Oxford University Press book, "Protected Area Management: Principles and Practice" by Graeme Worboys et al.

It was a most productive and enjoyable workshop.

At the Congress in Durban, a Mountain Dinner was held, with 85 mountain lovers in attendance. The program included a launch of Elsa Pooley's new book, "Guide to Mountain Flowers of the Maloti-Drakensberg Transfrontier Park," and a set of stories of the Sani Pass by Mike Clark. Larry Hamilton was presented with the Fred M. Packard International Parks Merit Award from the World Commission on Protected Areas, by the Chair Kenton Miller. This award is given for exceptional service to mountain protection around the world.

The mountain recommendation entitled "Strengthening Mountain Protected Areas as a Key Contribution to Sustainable Mountain Development," accepted as part of the Durban Accord, contains the following recommendations:

… the Pre-World Parks Congress Workshop on Mountain Protected Areas, … involving 60 managers, scientists and policy makers representing 23 countries:

1. *ENDORSE the establishment of an adequate and representative network of Mountain Protected Areas in all mountain regions as a key part of sustainable mountain development, including appropriate conservation linkages to adjacent landscapes and seascapes and working with local communities and land managers;*
2. *WELCOME the support for Mountain Protected Areas from outdoor recreation interests, as expressed in the Environmental Objectives and Guidelines of the International Mountaineering and Climbing Federation (UIAA), published during the International Year of Mountains;*
3. *URGE IUCN – the World Conservation Union, to:*
   - *a. Support the Mountain Initiative Task Force as an inter-Commission group involving primarily the World Commission on Protected Areas and the Commission on Ecosystem Management, with opportunities for other Commissions to contribute as appropriate;*
   - *b. Give particular attention to implementing the WCPA 2004–2008 Mountain Strategy, as endorsed by the Mountain Initiative Task Force;*
   - *c. Engage fully in the International Partnership for Sustainable Development in Mountain Regions, as a method of implementing Chapter 13 of Agenda 21;*
   - *d. Continue to press for recognition, during this International Year of Freshwater and beyond, of the vital role of Mountain Protected Areas in safeguarding water quality and quantity;*
   - *e. Provide leadership to highlight the vital relationship between biodiversity, mountains and protected areas as the CBD considers these topics at its 2004 meetings;*
   - *f. Give a prominent role to mountains and their protected areas at the 2004 World Conservation Congress; and*
   - *g. Provide a forum to discuss and advance transboundary protected areas in contributing to the conservation of regional biodiversity, recognizing the special circumstances of transboundary mountain communities, and resolving regional conflicts through mechanisms such as Peace Parks.*

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