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IN-DEPTH REVIEW OF THE IMPLEMENTATION OF THE PROGRAMME OF WORK ON MOUNTAIN BIOLOGICAL DIVERSITY

Note by the Executive Secretary

EXECUTIVE SUMMARY

The programme of work on mountain biological diversity was adopted in 2004 in decision VII/27. In annex II of decision VIII/10, the Conference of Parties decided to undertake an in-depth review of the implementation of the programme of work at its tenth meeting. Based on national reports received and information gathered from organizations, the Executive Secretary prepared this note to facilitate the work of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) at its fourteenth meeting to undertake the in-depth review prior to the tenth meeting of the Conference of the Parties.

In general, the implementation of the mountain biological diversity programme of work at global level has been successful in bringing together and stimulating the international mountain community. There has been fair to good progress in preventing and mitigating the negative impacts of key threats (goal 1.1), in protecting mountain biological diversity (goal 1.2), in promoting sustainable use (goal 1.3), in enhancing legal, policy, institutional framework (goal 2.1), in developing work on identification of mountain biological diversity (goal 3.1), in improving knowledge on and methods for the assessment and monitoring of the status and trends of mountain biological diversity (goal 3.2), in improving the infrastructure for accurate assessment and monitoring of mountain biological diversity and developing associated databases (goal 3.3), in improving research, technical and scientific cooperation on mountain biological diversity (goal 3.4), and in increasing public education in relation to mountain biological diversity (goal 3.5). Progress in achieving the other goals (1.4 on benefit-sharing, 1.5 on maintaining genetic diversity, 2.2 on traditional knowledge, 2.3 on transboundary collaboration and 3.6 promoting appropriate technologies for mountain ecosystems) was limited.

As of 2009, about 14.4 per cent of the mixed mountain system biome is protected exceeding the 10 per cent coverage target of the strategic plan under the Convention on Biological Diversity. Participation of international organizations such as the Food and Agriculture Organization of the United Nations (FAO), the International Centre for Integrated Mountain Development, the Consortium for Sustainable Development of the Andean Ecoregion, and the Mountain Partnership, and regional

* UNEP/CBD/SBSTTA/14/1.

conventions such as the Alpine and Carpathian Conventions ensured progress in national implementation of the programme of work. Contribution of the Global Mountain Biodiversity Assessment to the updating of the status and trends of mountain biological diversity was significant. Networks like the Global Observation Research Initiative in the Alpine Environments, and the Mountain Invasion Research Network are collecting information for long-term monitoring of threats to mountain biological diversity. Observance of the International Mountain Day on 11 December and many regional and local initiatives such as, among many others, the sustainable management of the Japanese *satoyama* landscapes are contributing to raising awareness of the need for conservation and sustainable use of mountain biological diversity, and to showcasing the upland-lowland connections.

Constraints to the national implementation of the programme of work include a limited institutional/policy development, inadequate capacity and financial resources, limited scientific inputs; inadequate effective networking and partnerships and/or collaboration among all stakeholders, limited awareness and participation of mountain communities and other stakeholders, and inadequate understanding of the impacts of global change including climate change on mountain biological diversity. Suggested strategies for addressing these constraints include, *inter alia*, increasing political will and commitment by reviving the momentum generated by the 2002 International Year of Mountains; creating enabling institutional mechanisms; implementing regional approaches with active involvement of organizations and regional conventions; establishing conservation corridors and effectively managed protected areas; promoting mountain-to-mountain cooperation and knowledge sharing; coordinating technical support, and mobilizing additional funding.

SUGGESTED RECOMMENDATIONS

The Subsidiary Body on Scientific, Technical and Technological Advice may wish to recommend that the Conference of the Parties adopt a decision along the following lines:

The Conference of the Parties,

Recalling paragraph 16 of General Assembly resolution 60/198 of 22 December 2005 and paragraph 26 of resolution 62/196 of 19 December 2007, in which the Assembly noted with satisfaction the adoption of the programme of work on mountain biological diversity under the Convention on Biological Diversity,

Also recalling paragraph 23 of General Assembly 64/205 of 21 December 2009, by which the Assembly invited States and other stakeholders to strengthen implementation of the programme of work on mountain biological diversity under the Convention on Biological Diversity through renewed political commitment and the establishment of appropriate multi-stakeholder institutional arrangements and mechanisms,

Status and trends of mountain biological diversity

1. *Welcomes* the progress made by the Global Mountain Biodiversity Assessment (GMBA) of DIVERSITAS in developing, in cooperation with the Global Biodiversity Information Facility, a thematic mountain portal to mine geo-referenced databases and allow searches for primary biodiversity data in a mountain-specific context and *invites* GMBA and other relevant organizations to regularly update the thematic portal and make the information widely available in various formats;

2. *Invites* Parties, other Governments, indigenous and local communities and relevant organizations to collect and update information periodically, monitor the changes and disseminate information on:

(a) Mountain biological diversity including on sites of biological, ecological and socio-economic importance, on ecosystem services, on endangered and endemic species, and on genetic resources including in particular genetic resources for food and agriculture;

(b) Related traditional knowledge and cultural dimension of the state of biodiversity;

(c) Direct and indirect drivers of change in mountain biodiversity, including, in particular, climate change, land-use change, and tourism and sports activities;

Programme element 1: Direct actions for conservation, sustainable use and benefit-sharing

3. *Invites* Parties, other Governments, indigenous and local communities, and relevant organizations to establish effectively and appropriately managed protected areas in line with the programme of work on protected areas to safeguard the highest priority key biodiversity areas in mountain ecosystems;

4. *Invites* Parties and other Governments to develop, taking into account and in line with the Strategic Plan for 2011-2020 and within their respective national biodiversity strategies and action plans, targets that address the direct drivers of mountain biodiversity loss, for the reduction of pressures on biodiversity from habitat change, overexploitation, pollution, invasive species and climate change, and for the safeguard and restoration of mountain biodiversity and related ecosystem services, contributing to climate change mitigation and adaptation, as well as the related indicators for assessing progress towards these targets;

5. *Invites* Parties, other Government, indigenous and local communities, and relevant organizations to address climate-change adaptation and mitigation issues, in line with the decisions on the in-depth review of work on biodiversity and climate change (see UNEP/CBD/SBSTTA/14/6) by:

(a) Developing and implementing measures for the *in situ* and, as needed, *ex situ* conservation of genetic resources and species currently and potentially under threat from climate change;

(b) Establishing, in particular, conservation corridors, connectivity, and transboundary mountain protected area systems taking into account the need to integrate protected areas into wider landscapes;

(c) Undertaking measures to reduce deforestation and restore degraded mountain forest ecosystems in order to enhance the role of mountains as natural carbon and water regulators;

(d) Developing, strengthening and implementing policies favorable to the conservation and sustainable use of genetic resources and related traditional knowledge for enhanced resilience and food security in the face of climate change impacts;

6. *Invites* relevant organizations and initiatives such as, among many others, the IUCN-WCPA mountains biome programme to assist countries in their programmes and projects relating to climate change;

Programme element 2: Means of implementation for conservation, sustainable use and benefit-sharing:

7. *Invites* Parties and other Governments to adopt a long-term vision and holistic approaches to the conservation and sustainable use of mountain biological diversity by developing specific actions, time tables and capacity-building needs for the implementation of the mountain biological diversity programme of work and integrating them with revised national biodiversity strategies and action plans in line with the revised strategic plan, as well as with overall sustainable development strategies in mountain regions;

8. *Encourages* Parties to establish national committees and multi-stakeholder institutional arrangements and mechanisms at national and regional levels to enhance intersectoral coordination and collaboration for sustainable mountain development as called for in paragraph 15 of General Assembly resolution 62/196 and linking them to the implementation of the programme of work on mountain biological diversity;

9. *Encourages* Parties, wherever possible, to develop and implement regional collaboration strategies and action plans with assistance of relevant international and regional organizations as needed, considering that regional collaboration is key for successful implementation;

10. *Invites* Parties, other Governments and relevant organizations to develop and showcase upland-lowland linkages, particularly in the easily demonstrated case of water, and the need for strengthening these linkages for the well-being of people especially in lowland areas through the uninterrupted provision of ecosystem services;

11. *Invites* the International Centre for Integrated Mountain Development (ICIMOD), Consorcio para el Desarrollo de la Ecoregion Andina (CONDESAN), the Alpine and Carpathian Conventions, and other relevant initiatives to strengthen their involvement in formulating regional strategies, to work closely with countries and to help in the implementation of the programme of work on mountain biological diversity;

12. *Requests* the Mountain Partnership, the Global Mountain Biodiversity Assessment (GMBA) and other initiatives to promote enhanced implementation of the programme of work on mountain biological diversity in close collaboration with Parties and organizations bearing in mind paragraph 23 of General Assembly resolution 64/205;

13. *Invites* Parties to revive and enhance indigenous mountain plant and animal genetic resources by providing incentives and marketing opportunities for the conservation and sustainable use of mountain biological diversity;

Programme element 3: Supporting actions for conservation, sustainable use and benefit-sharing

14. *Invites* Parties, other Governments and relevant organizations to develop and implement national, regional and global communication programmes highlighting the economic, ecological and social benefits of the conservation and sustainable use of mountain biological diversity for human well-being and for the provision of ecosystem services to mountain dwellers and also to lowland communities;

15. *Invites* Parties, other Governments and relevant organizations to develop educational programmes for raising awareness on mountain biological diversity;

16. *Invites* Parties, other Governments and relevant organizations to develop and implement mountain-to-mountain cooperation programmes for the exchange of best practices, expertise, information sharing and appropriate technologies;

17. *Encourages* Parties, other Governments and relevant organizations, with the collaboration of the scientific community, relevant intergovernmental organizations and mountain communities, to study the effects of climate change on mountain environments and biological diversity, in order to elaborate sustainable adaptation strategies to cope with adverse effects of climate change;

18. *Requests* the Executive Secretary to:

(a) Enhance collaboration and partnership with organizations, initiatives, regional conventions to support the Parties in their implementation of the programme of work on mountain biodiversity and related decisions, and

(b) Disseminate information, best practices, tools and resources relating to mountain biodiversity through the clearing-house mechanism and other means.

I INTRODUCTION

1. The programme of work on mountain biological diversity was adopted in 2004 in decision VII/27. In paragraph 10 (b) of this decision, the Conference of the Parties requested the Executive Secretary to compile information received from Parties, other Governments and relevant organizations and bodies, on the implementation of the programme of work. In paragraph 9 of decision VIII/15 the Conference of the Parties endorsed the goals and global outcome-oriented targets integrated into the programme of work on mountain biological diversity, noting that they are intended as guidance to Parties in their implementation of national biodiversity strategies and action plans. In annex II of decision VIII/10, the Conference of the Parties decided to undertake the in-depth review of the

programme of work on mountain biological diversity at its tenth meeting. Accordingly, SBSTTA at its fourteenth meeting is considering the in-depth review of the implementation of the programme of work on mountain biological diversity, prior to the tenth meeting of the Conference of the Parties.

2. In paragraph 9 of decision VIII/14, the Conference of the Parties invited Parties, on a voluntary basis, to provide information that could be useful for the in-depth review of thematic programmes included in the multi-year programme of work of the Conference of the Parties up to 2010. In pursuance of this, the Executive Secretary sent out a notification (No 2008-90, dated 23 July 2008) to Parties, other Governments and relevant organizations inviting them to submit information on implementation of the programme of work on mountain biological diversity taking into account the outcome oriented targets agreed in decision VIII/15 for mountain biological diversity programme of work. In response the Secretariat received submissions from China, Chile, Egypt, India, Iran, Mauritius, Mexico, Poland, Trinidad and Tobago and the United Kingdom. The International Centre for Integrated Mountain Development (ICIMOD), the Carpathian Convention, the Global Mountain Biodiversity Assessment (GMBA), the Mountain Partnership and the Mountain Forum also provided information.

3. The Executive Secretary, based mainly on information contained in 130 third national reports, supplemented with information contained in submissions received from Parties and organizations mentioned in paragraph 2 above, and information contained in 64 fourth national reports received as of September 2009, prepared the present note, for consideration by SBSTTA at its fourteenth meeting. Section II contains a synthesis of information on progress towards achieving goals of the programme of work. Section III describes the main obstacles encountered by the countries in implementing the programme of work, an overall assessment of progress and some ways forward for furthering implementation.

4. An earlier draft of this note was posted for review from 17 November to 20 December 2009 in accordance with notification 2009-156, and the comments received have been incorporated as appropriate.

II. PROGRESS IN IMPLEMENTATION OF THE PROGRAMME OF WORK

5. It should be noted that percentages used in the present report relates to the 130 third national reports submitted to the Executive Secretary. In describing general progress, “nearly all” indicates at least 90 per cent (excellent progress), “most” indicates in the range of 70 -90 per cent (good progress), “many” indicates in the range of 40 -70 per cent (fair progress), “some” indicates 15- 40 per cent (some progress) and “few” indicates less than 15 per cent (very little progress). A global snapshot of progress taking into account the relevant targets adopted in annex IV of decision VIII/15 as key issues considered for assessing progress is presented in the following table.

Table: Global progress in achieving the goals and targets of the programme of work on mountain biological diversity

Goal	Elements considered for assessing progress, taking into account relevant targets contained in annex IV of decision VIII/15	Level of progress
Goal 1.1: To prevent and mitigate the negative impacts of key threats to mountain biological diversity	Key threats identified, measures taken (target 5.1), management plans for IAS (target 6.2), mechanisms for addressing climate change impact (target 7.2)	Good progress
Goal 1.2: To protect, recover, and restore mountain biological diversity	Protected area network (targets 1.1 and 1.2), measures for conserving threatened species (targets 2.1 and 2.2)	Good progress

Goal	Elements considered for assessing progress, taking into account relevant targets contained in annex IV of decision VIII/15	Level of progress
Goal 1.3: To promote the sustainable use of mountain biological resources	Measures for sustainable use; mountain based products derived from sustainably managed areas (target 4.1); any species endangered by international trade (target 4.3)	Fair progress
Goal 1.4: To promote access to, and sharing of benefits arising from the utilization of genetic resources related to mountain biological diversity in accordance with national legislation where it exists	Measures taken for access and benefit-sharing (targets 10.2 and 10.2)	Some progress
Goal 1.5 : To maintain genetic diversity in mountain ecosystems in particular through the preservation and maintenance of traditional knowledge and practices	Measures for conserving genetic diversity including associated traditional knowledge (target 3.1)	Some progress
Goal 2.1. To enhance the legal, policy, institutional, and economic framework	Appropriate policy, institutional and economic frameworks in place.	Fair progress
Goal 2.2. To respect, preserve, and maintain knowledge, practices and innovations of indigenous and local communities in mountain regions	Measures taken for: protecting traditional knowledge (targets 9.1 and 9.2);	Some progress
Goal 2.3. To establish regional and transboundary collaboration and the establishment of cooperative agreements	Collaboration across national boundaries and regional cooperative agreements	Some progress
Goal 3.1. To develop work on identification, monitoring and assessment of mountain biological diversity	Measures taken for identification, monitoring and assessment	Fair progress
Goal 3.2. To improve knowledge on and methods for the assessment and monitoring of the status and trends of mountain biological diversity based on available information	Status and trends; measures taken to address climate change, pollution, sustainable tourism (targets 7.1 and 7.2)	Fair progress
Goal 3.3. To improve the infrastructure for data and information management for accurate assessment and monitoring of mountain biological diversity and develop associated databases	Measures taken to improve technical capacity, infrastructure and management of information; use of GIS and remote sensing techniques	Fair progress
Goal 3.4. To improve research, technical and scientific cooperation, and other forms of capacity-building related to mountain	Measures to improve research, technical cooperation	Fair progress

Goal	Elements considered for assessing progress, taking into account relevant targets contained in annex IV of decision VIII/15	Level of progress
biological diversity.		
Goal 3.5. To increase public education, participation and awareness in relation to mountain biological diversity	Programmes for education and awareness creation	Fair progress
Goal 3.6 To promote the development, validation, and transfer of appropriate technologies for mountain ecosystems, including indigenous technologies in accordance with Article 8(j) of the Convention on Biological Diversity and related provisions	Measures for transfer of technologies including indigenous technologies (target 11.2)	Some progress

Programme element 1: Direct actions for conservation, sustainable use and benefit sharing

Goal 1.1: To prevent and mitigate the negative impacts of key threats to mountain biological diversity

6. Progress in this goal is good. Seventy-three per cent of the 130 reporting countries indicated that they have taken measures to mitigate the negative impacts of the following key threats to mountain biodiversity: land-use change and land degradation as a result of expansion and intensive agriculture, over extraction of resources, over grazing, unsustainable development policies and programmes; invasive alien species and impacts of climate change. Measures used include establishment and effective management of protected areas; implementation of landscape and ecosystem approaches; anti-erosion measures, reforestation, forest fire prevention measures, climate change monitoring, mitigation and adaptation measures; spatial planning, management plans and legal frameworks for invasive alien species. Regional knowledge and learning centres like ICIMOD, CONDESAN, the Mountain Partnership's regional nodes, regional conventions like the Carpathian and Alpine Conventions; and global research networks like the Mountain Research Initiative (MRI), Mountain Invasion Research Network (MIREN) and Global Observation Research Initiative in Alpine Environments (GLORIA) are collecting and documenting information on threats to mountain biological diversity (see box 1 on GLORIA and box 2 on MIREN).

Box 1: The Global Observation Research Initiative in Alpine Environments (GLORIA) established and maintains a site-based network for the long-term surveillance of climate change impacts on fragile alpine ecosystems and their biodiversity in high mountain systems around the world. The network currently comprises more than 50 teams working in 70 mountain regions on five continents. New sites are being established, in the Americas and Asia in particular. The internationally standardized methodology and the rapidly growing number of observation sites build the foundation for a global indicator on warming-induced losses of biodiversity in alpine environments. Such an indicator, based on changes in species cover of vascular plants across Europe, is currently in development <http://www.gloria.ac.at/>.

Box 2: The Mountain Invasion Research Network (MIREN) investigates the degree of plant invasion in mountain ecosystems, to evaluate and communicate the future threat from plant invasions associated with global warming and changing land-use patterns. The MIREN core programme comprises comparative research in six mountain regions (Pacific northwest United States, Swiss Alps, Chilean Andes, Australian Alps, Hawaii, and the Canary Islands, Spain), covering major climatic zones including island and continental Systems. A database of non-native plants in mountains worldwide contains almost 1,500 naturalized or invasive plant taxa. The most widespread mountain plant invaders are species typical of native European pastures (e.g. *Dactylis glomerata*, *Rumex acetosella*, *Trifolium repens*). Only a few of these (e.g. *Achillea millefolium*, *Holcus lanatus*, *Verbascum thapsus*) are regarded as threats to biodiversity where they occur. In contrast, woody species (e.g. *Acacia spp.*, *Cytisus scoparius*, *Pinus spp.*, *Salix spp.*, *Ulex europaeus*), which were often introduced for soil improvement or forestry, are widely regarded as problematic because they alter vegetation structure, soil chemistry and fire susceptibility. Further, taxa from the genera *Centaurea*, *Hieracium* and *Linaria* are of particular management concern in many regions.

www.miren.ethz.ch

Goal 1.2: To protect, recover, and restore mountain biological diversity

7. Progress in this goal is good, especially in establishing mountain protected areas. Seventy-eight per cent of reporting countries indicated taking measures to protect recover and restore mountain biodiversity. Almost all reporting countries indicated the establishment of mountain protected areas including national parks, Ramsar sites, UNESCO Biosphere Reserves and Natura 2000 sites, as a key measure for protecting mountain biological diversity. The most recent analysis of protected area coverage of mountain systems was carried out by UNEP-WCMC in 2009¹ using the Udvardy 'Mixed Mountain Systems' biome and the 2009 release of the WDPA, which indicated that 14.4 per cent of this biome is protected, passing the 10 per cent goal of the strategic plan. About 39 per cent of the Hindu Kush Himalayan (HKH) region shared by eight regional member countries of ICIMOD is under protection with 488 protected areas falling within the IUCN's categories I-VI

8. Even though mountain systems are well-represented in the global network of mountain protected areas, a major weakness of these areas is that most are discrete, covering single mountains and limited to uppermost elevations.² Connectivity between these 'sky-islands' is badly needed along the ranges or in biogeographic clusters for species viability and survival. These islands need to be extended toward the lowlands, even to the seas to provide altitudinal migration opportunities for climate change adaptation of species using ecosystem and landscape approaches. ICIMOD is promoting regional cooperation in HKH countries through conservation corridors to restore disturbed connectivity between existing mountain protected areas across political boundaries. This is a key activity within the Connectivity Theme of IUCN's World Commission on Protected Areas. In Europe a number of governmental and non-governmental organizations cooperate to develop a corridor between Alps and the Carpathians and to foster exchange on ecological networks. The Yellowstone-to-Yukon Conservation Initiative of 3000km is probably the most highly developed continental-scale connectivity initiative.

9. In addition, integrated watershed management focusing on soil conservation and enhancement of ecosystem services, co-management of rangelands focusing on livelihoods of pastoral communities, reforestation, *ex-situ* conservation measures, restoration activities, sustainable management plans,

³ Coad L., Burgess, N.D., Bomhard, B. and Besancon, C. 2009. Progress on the Convention on Biological Diversity's 2010 and 2012 Targets for Protected Area Coverage. A technical report for the IUCN international workshop "Looking to the Future of the CBD Programme of Work on Protected Areas", Jeju Island, Republic of Korea, 14-17 September 2009. UNEP-WCMC, Cambridge, UK.

² Millennium Ecosystem Assessment, chapter 24 on Mountain Systems (p.708)
<http://www.millenniumassessment.org/documents/document.293.aspx.pdf>

reintroduction of species, and prohibition of illegal hunting are some other measures that countries have reported for restoring mountain biological diversity.

Goal 1.3: To promote the sustainable use of mountain biological resources

10. Progress in this goal at global level is fair. Sixty-seven percent of reporting countries have taken measures to promote the sustainable use of mountain biological resources and to maintain genetic diversity in mountain ecosystems. Measures taken include: establishment of networks of protected areas including for plant genetic recourses for food and agriculture such as potato park in Peru, range management schemes, promotion of indigenous species, re-introduction of species, establishment of a genetic bank, banning or regulating illegal hunting and logging, promoting local community involvement in management of protected areas and employing an ecosystem-based approach to management (see boxes 3 and 4). A few countries have also developed strategies, programmes and projects for promoting (see: http://www.fao.org/mnts/act_mount_prod_en.asp) sustainable use of mountain biological resources, such as a national mountain development programme or strategy, a national biodiversity strategy, a national forestry programme and an integrated programme for soil and watershed management. A few European countries reported their efforts in this regard for implementing the Alpine Convention and its protocols and promoting the European Community policy of “Support for Less Favoured Areas (LFA)”.

11. A few countries also indicated adoption of the ecosystem approach, community-based natural resource management, regulation of over harvesting of non forest timber products such as bush meat and medicinal plants, promotion of nature-based mountain tourism and developing markets for mountain products etc., for promoting sustainable use. FAO in the context of the Mountain Partnership launched the “Mountain Products Programme” with the over all goal of promoting and protecting local high quality products as a strategy for sustainable development in mountain regions. In this project the market potential of medicinal/aromatic plants of: the southern and eastern Mediterranean regions; the native potato, cheese and specialty coffee of Peru, Bolivia and Ethiopia, wild mushrooms of Bhutan, tasar silk and forest honey of India, handmade paper and medicinal plants of Nepal, and specialty coffee, honey and macadamia sectors of Kenya have been analysed and mountain communities are being provided information on market access and how to obtain premium prices for their products at home and abroad.

12. TRAFFIC, the Wildlife Trade Monitoring Programme in conjunction with IUCN and WWF and many other national partners, supported the sustainable use and conservation of medicinal and aromatic plants, and the equitable sharing of benefits from their use, in the mountain ecosystems of Nepal, India, Lesotho and in upper Yangtze River Basin of south-west China under its project “Saving Plants that Save Livelihoods”. In this project, priority species for investment to promote effective management of collection and trade in selected sites are identified in collaboration and partnership with key local stakeholders to raise awareness and acceptance for sustainable and ethical sourcing of medicinal and aromatic plants.

Box 3. Andean tubers: from conservation to sustainable use

Andean tubers are known as the “lost crops of the Incas” and the local communities grow land races of four different potato species (*Solanum andigena*, *S.xajanbui*, *S. stenotomum*, and *S. phureja*), Ulluco (*Ullucus tuberosus*) and mashuva (*Tropaeolum tuberosum*) in different ecological zones from 3200 m to 3900 m altitude. With increasing market integration, their cultivation has decreased and diversity has been lost. The Foundation for the Promotion and Investigation of Andean Products (PROINPA) facilitated sustainable use of Andean tubers, by addressing production constraints and local, social, economic and political environments. By organizing annual biodiversity fairs, PROINPA raised awareness about the availability of land races in Andean Tubers and the exchange of the germplasm among the farmers. PROINPA developed meristem thermo-therapy for producing virus-free seed in 24 potato land races, two landraces of Oca (*Oxalis tuberosa*), and Ulluco and helped farmers in their on-farm cultivation using local knowledge of rotational cropping, soil fertility and pests. By promoting market facilities for native land races of Andean tubers, PROINPA promoted the conservation of genetic diversity of Andean tubers, and promoted their sustainable use for livelihoods of mountain people.

Box 4. The Satoyama landscapes: a harmonious interaction between rural societies and nature

The Japanese Satoyama Landscape has evolved through prolonged interaction between human lifestyles and the natural world. Sato = village, yama = mountain: a traditional Japanese socio-ecological production landscape is an example of multi-functional land use wherein secondary successional communities of mountain woodlands, bamboo grooves and managed grasslands are juxtaposed with arable fields, orchards, rice paddies, irrigation ponds and farmsteads providing a complex interdependent ecosystem. Satoyama landscapes facilitate harmonious interaction among all components for efficient discharge of ecological functions, sustainable use of natural resources and increased supply of ecosystem goods and services. Satoyama landscapes illustrate the efficient upland and lowland linkages for achieving sustainable use and rehabilitation of ecosystems. At the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity, the host country, Japan, will propose the Satoyama Initiative as a model for sustainable rural development to promote balanced land use and resource management systems for achieving conservation and sustainable use of biological diversity while ensuring human well-being.

Goal 1.4: To promote access to, and sharing of benefits arising from the utilization of genetic resources related to mountain biological diversity in accordance with national legislation where it exists; Goal 1.5: To maintain genetic diversity in mountain ecosystems in particular through the preservation and maintenance of traditional knowledge and practices ; and Goal 2.2: To respect, preserve, and maintain knowledge, practices and innovations of indigenous and local communities in mountain regions

13. These three goals have been taken together due to their interrelatedness and to avoid repetition. In general, there is some to fair progress in these goals at global level. Thirty-five percent of reporting countries have taken measures for benefit-sharing from the utilization of mountain genetic resources, and for preservation and maintenance of traditional knowledge. Twenty-seven countries indicated that such measures are under development and 37 countries that no such measures had been taken. Measures taken include: traditional medicine surveys and studies; *ex situ* conservation of genetic resources; traditional knowledge inventory; policy and legal frameworks; and incentives for organic farming. A number of countries have developed strategies, laws, programmes or mechanisms for sharing benefits arising from the use of genetic resources, including those from mountain ecosystems, or protection of traditional knowledge associated with the use of mountain genetic resources. Some countries reported their efforts in documenting traditional knowledge (TK) in the form of people's biodiversity registers to preserve and maintain TK and organization of fairs and campaigns for creating awareness on the conservation of landraces and local breeds (see box 5). ICIMOD published a manual on access and benefit-sharing and traditional knowledge for Hindu Kush-Himalayan (HKH) countries.³ ICIMOD and the Tebtebba Foundation (Philippines) analysed the achievements of the first International Decade of the World's Indigenous People in 10 countries in Asia with a specific focus on mountain areas. The findings show that most Governments still do not fully recognize indigenous peoples in their national constitutions, especially their right to access land and natural resources.⁴

³ Oli, K.P and T.Dhakal (2009) Access and Benefit Sharing from Genetic Resources and Associated Traditional Knowledge – Training of Trainers and Resource Manual. ICIMOD <http://books.icimod.org>.

⁴ General Assembly document A/64/222- Sustainable mountain development. dated 9 August 2009.

Box 5. Biodiversity conservation and crop improvement: Insights from Guangxi, China

On steep mountain slopes, in a very limited number of flat fields in Guanxi mountainous region of China, ethnic Zhuang farmers cultivate a variety of land races of maize. The Centre for Chinese Agricultural Policy (CCAP) in collaboration with Zhuang farmers conserved maize landraces, and improved maize germplasm and maize production. Using Zhuang farmers' traditional knowledge about crops, their environment and practices, CCAP tested a large number of landraces, open-pollinated varieties, and waxy maize varieties for improvement. Through "Seed Fairs" CCAP encouraged Zhuang farmers to share their knowledge, land races, and planting experience. These fairs became popular and helped people value, collect and exchange local genetic resources and enhance ethnic biodiversity.

Yiching Song, Zhang Shihuang and Ronnie Vernooy. *Mountain Forum Bulletin*, volume IX, issue 2, July 2009, pp. 14-16.

Programme element 2: Means of implementation for conservation, sustainable use and benefit sharing

Goal 2.1: To enhance the legal, policy, institutional, and economic framework

14. Progress in this goal is fair. Fifty-three per cent of reporting countries have indicated development of legal, policy and institutional frameworks for the conservation and sustainable use of mountain biodiversity and for implementing the programme of work. However, only a few reporting countries have provided information on strategies, programmes or laws for conservation and sustainable use of mountain ecosystems. In a majority of countries, the policy and legal frameworks for conservation and sustainable use of mountain ecosystems are included in broader or relevant sectoral policy frameworks such as national biodiversity strategies and action plans, and water, forest, soil conservation, watershed management as well as grazing and range management policies and programmes. Some recent examples of countries developing policy and legal and institutional frameworks include *inter alia*: Kyrgyzstan adopted a law in 2009 for transferring the responsibility of pasture management to local users; the Philippines launched a comprehensive upland development programme in 2007 focusing on the environmental services provided by watersheds; Ecuador adopted a new constitution in 2008, that focuses on environmental conservation in fragile ecosystems including mountain ecosystems; Argentina established a national committee dedicated to sustainable development of mountain regions. The Mountain Partnership (MP) and the FAO sustainable agriculture and rural development in mountains (SARD-M) project are contributing to development of policy institutional and economic framework in mountain regions (see box 6 on MP and SARD-M).

Box 6. The Mountain Partnership (MP) and the sustainable agriculture and rural development in mountains (SARD-M) project. MP is a voluntary alliance of partners dedicated to improving the lives of mountain people and protecting mountain environments around the world. MP is a mechanism for networking, communication and information sharing and functions as a clearing-house for members presently include 50 countries, 16 intergovernmental organizations and 96 major groups. It complements, supports and strengthens ongoing initiatives in sustainable mountain development. MP also functions as a broker for joint initiatives; facilitating contact between countries and institutions in view of joint activities and creating conditions for cooperation and resource mobilization at the national, regional and global level. <http://www.mountainpartnership.org/>.

SARD-M project, facilitated by FAO, assesses the strengths and weaknesses of mountain policies, institutions and processes in terms of social, economic and environmental aspects. Rapid assessments have been conducted in the Andes, the Carpathians, Central America, the Hindu Kush-Himalaya region, the Mediterranean Basin, South-East Europe and East Africa. Its overall report, published in 2007, provides an analysis of the major findings and knowledge on how to mainstream sustainable mountain development into national and regional policymaking. www.fao.org/sard/initiative

Goal 2.2: see Goals 1.4 and 1.5 above

Goal 2.3. To establish regional and transboundary collaboration and the establishment of cooperative agreements

15. At global level there is some progress in this goal. Thirty-nine percent of reporting countries have been involved in regional and/or transboundary cooperative agreements on mountain ecosystems for conservation and sustainable use of mountain biodiversity. Many countries are involved in regional cooperation. For example, 15 European countries are involved in collaborative activities under the Alpine Convention and the Carpathian Convention (see box 7). Networks of protected areas and local communities have been established under the Alpine Convention. Many countries have also concluded bilateral agreements or put in place such collaborative mechanisms with their neighboring countries or those countries sharing mountain ecosystems. Examples of such collaboration are: The Maloti/Drakensburg Transfrontier conservation development between Lesotho and South Africa; Liberia, Côte d'Ivoire and Guinea initiated a tri-national transboundary programme for the conservation of the Nimba mountains; the Waterton-Glacier International Peace Park between the United States of America and Canada; and the transboundary cooperative agreement on the Kanchenjunga landscape among India, Nepal and Bhutan (see box 7).

Box 7. The ICIMOD Regional Cooperation Framework for Implementation of the Convention on Biological Diversity in Kanchenjunga Landscape

The International Centre for Integrated Mountain Development (ICIMOD) developed a Regional Cooperative Framework for implementation of the Convention on Biological Diversity in the Kanchenjunga Landscape in India, Bhutan and Nepal. The framework is a tool to: (i) help address the root causes of biodiversity loss in the landscape; (ii) encourage fast track planning and implementation of programmes; and (iii) enhance complementarities and coordination between and among diverse actors engaged in biodiversity conservation in the landscape. The framework is implemented through four elements: (i) transboundary cooperation; (ii) scientific and technical cooperation; (iii) information exchange and sharing; and 4) regional guidelines and soft legal instruments. The framework presented minimum standards and indicators under each of these four elements. Using a participatory approach, six potential conservation corridors linking nine protected areas are identified in the framework. Community-based conservation projects are being implemented in the conservation corridors focusing on improving the community livelihoods through adoption of conservation-linked development activities.

Sharma, E., N. Chettri, J. Gurung and B. Shakya (2007). Landscape approach in biodiversity conservation: A regional cooperation framework for implementation of the Convention on Biological Diversity in Kangchenjunga Landscape. ICIMOD, Kathmandu <http://apps.icimod.org/elibrary/index.php/search/subject/2>

The Alpine and the Carpathian Convention – two Regional Cooperation Frameworks

Within the framework of both Conventions, two Protocols dealing with biodiversity in particular mountain ecosystems have been adopted, including transboundary projects. In May 2008, the respective secretariats of both conventions signed a Memorandum of Understanding with the Secretariat of the Convention on Biological Diversity, focusing on many areas of cooperation. The secretariats of the Alpine and Carpathian conventions collaborated in the establishment of the Carpathian Network of Protected Areas and provided assistance, to transboundary projects for protected areas in South-East Europe e.g. Durmitor – Tara Canyon – Sutjeska Under the aegis of the “Dinaric Arc and Balkans Environment Outlook, a field a study was concluded preparing the way for the establishment of a possible network of protected areas in the Balkans and the Dinaric Arc. The exchange of experiences from the Alpine Network and the Carpathian Networks of Protected Areas played an important role in this context. www.alpconv.org, www.carpathianconvention.org

16. Within the Ramsar Convention framework, the Andean countries developed a regional strategy for the conservation and sustainable use of High Andean Wetlands. This strategy is a guiding framework for regional cooperation among high Andean countries – Argentina, Bolivia, Chile, Colombia, Costa

Rica, Ecuador, Peru and Venezuela – for a 10 year period for conservation and sustainable use of wetlands in paramos, jalca, puna and other high Andean ecosystems.⁵

Programme element 3: Supporting actions for conservation, sustainable use and benefit-sharing

Goal 3.1. To develop work on identification, monitoring and assessment of mountain biological diversity; Goal 3.2. To improve knowledge on and methods for the assessment and monitoring of the status and trends of mountain biological diversity based on available information; and Goal 3.3. To improve the infrastructure for data and information management for accurate assessment and monitoring of mountain biological diversity and develop associated databases

17. These three goals have been taken together due to their interrelatedness and to avoid repetition. In general, progress in these goals at global level is fair. Sixty-two percent of reporting countries have taken measures to identify, monitor and assess mountain biodiversity. Reported efforts are often part of broader initiatives to assess and monitor biodiversity at a national scale. Some countries also reported location-specific assessments. A few countries have made such assessments as a part of their efforts to develop flora and fauna inventories or a part of their biodiversity country studies or at wider scales, such as in the work of the European Environment Agency's European Topic Centre on Biodiversity. A few countries have established networks to monitor and assess mountain ecosystems, including remote sensing and Geographic Information System technologies, mostly as a part of their efforts to monitor other related ecosystems such as forests. The Global Mountain Biodiversity Assessment of DIVERSITAS in collaboration with Global Biodiversity Information Facility is developing a mountain portal on geo-reference databases of biological diversity (see box 8 on GMBA).

Box 8. The Global Mountain Biodiversity Assessment (GMBA), a crosscutting network of DIVERSITAS, actively explores and synthesizes findings from research on mountain biodiversity and provides a link between science and policy. GMBA documents and synthesizes knowledge on mountain biodiversity and communicates these findings to international policy fora and interested institutions. At present, GMBA is a network of about 400 researchers and policy makers in the field of mountain biodiversity, and 946 subscribed members, in 71 countries. GMBA looks at all 3 dimensions; the horizontal, biogeographic dimension with a zonal emphasis on the global scale; the vertical bioclimatic dimension with elevation transects on a regional scale; and the temporal dimension looking at past, present, and future situations by revisiting sites and using modeling. GMBA, in cooperation with the Global Biodiversity Information Facility (GBIF), is encouraging a worldwide effort to mine geo-referenced databases on mountain organisms since accurate geographical coordinates and altitude specifications (georeferences) of observed or collected biological species are the vital link between biological data and other geophysical information. GMBA and GBIF are constructing a thematic Internet portal, making GBIF data available in a mountain-specific context.

<http://gmba.unibas.ch/index/index.htm>

18. Individual projects like Data Infrastructure for the Alps: Mountain oriented Network Technology (DIAMONT); Alpine Delphi's agrobiodiversity monitoring in the Alps; initiatives under ICIMOD, CONDESAN, Mountain Partnership, MRI, MIREN, UNEP-WCMC, Alliance for Zero Extinction, and IUCN also develop information and databases on mountain biological diversity and monitor trends.

Goal 3.4. To improve research, technical and scientific cooperation, and other forms of capacity-building related to mountain biological diversity

19. Progress in this goal is fair. Sixty-one percent of reporting countries indicated they have taken measures or developed programmes to improve research, technical and scientific cooperation and capacity building. A few Parties mentioned North-South collaboration. A few European countries reported on such collaborative activities under the framework of the Alpine and Carpathian conventions. Nepal and the Netherlands reported on activities undertaken in this field by ICIMOD. The Mountain Forum and ICIMOD mentioned south-south cooperation and mountain to mountain exchange in

⁵ www.ramsar.org/cop9/cop9_doc26_e.htm

Himal-Andes. Some countries also established specialized research institutions for mountain environments including biological diversity (e.g. the G.B. Pant Institute of Himalayan Environment and Development, India). The Mountain Research Initiative catalyses inter-disciplinary research by facilitating long-term monitoring of environmental change in mountain regions, integrating model based studies, processing the studies and providing advice on sustainable land use and natural resource management.⁶ A particular focus has been on the UNESCO mountain biosphere reserves, through the GLOCHAMORE (Global Change in Mountain Regions) project and subsequent activities.

Goal 3.5. To increase public education, participation and awareness in relation to mountain biological diversity

20. Progress in this goal is fair. Some of the reporting countries indicated organizing higher educational courses which address mountain biodiversity (e.g. M.Sc. in Managing Sustainable Mountain Development and M.Sc. in sustainable uplands, UHI Millennium Institute and University of Cumbria, United Kingdom). A majority of countries reported that activities for raising awareness of mountain biological diversity have been undertaken as part of celebration of various International Days such as World Environment Day, International Day for Biological Diversity, Wetlands Day and International Mountain Day. The United Nations General Assembly designated 11 December as “International Mountain Day” (IMD) and mandated the Food and Agriculture Organization of the United Nations (FAO) to lead its observance. Since 2003, IMD has been celebrated each year with a specific theme. FAO produced a series of communication materials and tools to promote observance of IMD at national level. Observation of IMD 2006 with the theme on mountain biodiversity provided an opportunity to raise awareness about the need to manage mountain biodiversity in a sustainable manner.

Goal 3.6. To promote the development, validation, and transfer of appropriate technologies for mountain ecosystems, including indigenous technologies in accordance with Article 8(j) of the Convention on Biological Diversity and related provisions

21. At global level there is some progress in this goal. Sixty-three per cent of the reporting Parties have not taken any measures to develop, promote, validate and transfer appropriate technologies for the conservation of mountain ecosystems. A few European countries, including the European Community, mentioned the funding instrument Financial Instrument for the Environment (LIFE), which provides financial and technical support to programmes for conservation and sustainable use of mountain ecosystems. Germany reported on networks being established for the implementation of the Alpine Convention, with a focus on establishing ecological connectivity in the Alps. Among others, these networks promote exchange of information and technology transfer. Bangladesh reported on Sloping Agricultural Land Technology for planting terraces with annual and perennial crops between rows of nitrogen-fixing socially valued perennial tree species. The Peru recognition and mentoring programmes (RAMP PERU) contributed to the development of 18 technological prototypes including improved ecological stoves, solar water heaters and biodegradable flowerpots.⁷

III OVERALL ASSESSMENT OF PROGRESS, OBSTACLES AND CHALLENGES IN IMPLEMENTATION AND WAYS AND MEANS TO ADDRESS CHALLENGES AND OBSTACLES

A. Overall assessment of progress

22. In general, the implementation of the mountain biological diversity programme of work at global level is successful in four different ways:

(a) The programme of work has brought together and stimulated the international mountain community. Wherever international organizations such as the International Centre for Integrated

⁶ www.mri.scnatweb.ch

⁷ www.ramp-peru.org.pe

Mountain Development, the Consortium for Sustainable Development of the Andean Ecoregion, FAO, the Mountain Partnership, regional conventions such as Alpine and Carpathian conventions are actively associated, implementation of the programme of work at national level is progressing well. There has been fair to good progress in a significant number of goals;

(b) The Global Mountain Biodiversity Assessment is contributing significantly to updating of the status and trends of mountain biological diversity, and networks like Global Observation Research Initiative in the Alpine Environments, Mountain Invasion Research Network, the World Conservation Monitoring Centre of the United Nations Environment Programme (UNEP-WCMC), Alliance for Zero Extinction, and the International Union for Conservation of Nature (IUCN) are collecting information for long-term monitoring of threats to mountain biological diversity;

(c) As of 2009, about 14.4 per cent of the mixed mountain system biome is protected exceeding the 10 per cent target of the Strategic Plan under the Convention on Biological Diversity and contributing to achievement of the 2010 target. There is also a steady increase in the number of mountain protected areas all over the world. Progress was also observed towards the achievement of other targets adopted in decision VIII/15;

(d) Observance of International Mountain Day and many regional and local initiatives are contributing to raising awareness on the need for conservation and sustainable use of mountain biological diversity, and to showcasing the upland-lowland connections.

B. Obstacles

23. In the third national reports and in the voluntary submissions, Parties identified major obstacles and challenges they are facing in the implementation of the programme of work, which could be grouped into: inadequate institutional/policy development and their effective implementation due to a lack of capacity and financial resources; limited scientific inputs; inadequate networking and partnerships/collaboration among all stakeholders; limited awareness and participation of stakeholders mountain communities and local; and inadequate understanding of impacts of global change including climate change, on mountain biological diversity.

C. Ways and means to overcome the obstacles

24. The programme of work aims to conserve mountain biological diversity and maintain the goods and services of mountain ecosystems, and to contribute to poverty alleviation and to the achievement of the Millennium Development Goals. Underlying the goals of the programme of work is the notion that sustainability will be achieved in mountain areas by reducing poverty, inequality, and marginality, by preventing deterioration of natural resources and environments, and by improving the capabilities of institutions and organizations to promote the conservation and sustainable use of biological diversity. Hence, effective implementation of the programme of work calls for a concerted commitment and action from all stakeholders and sectors of the society.

Inadequate institutional/policy development and their effective implementation due to lack of capacity and financial resources

25. Agenda 21, chapter 13, on sustainable mountain development, paragraph 42 of the Johannesburg Plan of Implementation, the International Year of Mountains, chapter 24 of Millennium Ecosystem Assessment on mountain systems, and the General Assembly resolutions 60/198 and 62/196 created the necessary impetus to the development of conducive national, regional and global policies and institutions for sustainable mountain development. But still in some areas like sustainable use, remunerating upland ecosystem services, the policies are inadequate and more importantly effective implementation of the existing policies through enhanced intersectoral coordination and collaboration is needed. As called for in paragraph 15 of General Assembly resolution 62/196, the further establishment of national committees and multi-stakeholder institutional arrangements and mechanisms and linking them to the implementation of national biodiversity strategy and action plans (NBSAP) is required. The revised NBSAPs in accordance with the new Strategic Plan of the Convention may, *inter alia*, incorporate specific actions, time tables and capacity-building needs for implementation of the mountain biological diversity

programme of work. Considering that regional collaboration is a key for successful implementation, as shown by the ICIMOD Regional Cooperation Framework for Implementation of the Convention on Biological Diversity in the Kanchenjunga Landscape, wherever possible, development of regional collaboration strategies and action plans should be considered. In addition, it is necessary to strengthen capacities of institutions and all stakeholders, for implementation of the programme of work, based upon national and regional action plans.

Limited scientific inputs

26. Loss of biodiversity results in decline of ecosystem goods and services. However, recognition of these processes is not always properly understood or documented including the knowledge of how the uplands and lowlands interact and their linkages. This complexity underscores the necessity to generate not only knowledge and practice of ecosystem and landscape-based approaches (e.g., Satoyama) to management, but also to make it available to all stakeholders. This calls for systematic development and sharing of scientific information through networking. The existing networks of international, regional and national organizations should play an important role in a systematic and coherent manner.

Limited awareness and participation of stakeholders and mountain communities

27. Without public education and awareness, there can be no public participation. Without public participation and stakeholder involvement, effective implementation of any programme cannot be achieved. There is a need for development and implementation of national, regional and global communication programmes highlighting the economic, ecological and social benefits of conservation and sustainable use of mountain biological diversity for human well being and the provision of ecosystem services. This awareness would also facilitate development of innovative means of financing implementation of the mountain biological diversity programme and sustainable mountain development. In addition, showcasing upland-lowland linkages, for the well-being of people in lowland areas is essential.

28. There is a need for increased involvement of local authorities, as well as other relevant stakeholders, including civil society, local and indigenous communities and the private sector, in the development and implementation of programmes, land-use planning and land tenure arrangements, and activities related to the conservation and sustainable use of mountain biological diversity.

Inadequate networking, partnership/collaboration and exchange of information

29. Although there are many well-intentioned organizations working on mountain biodiversity, often there is not much interaction, coordination or horizontal cooperation among them. This results in non-integrated approaches, duplication of knowledge and data, inefficient use of resources, and lack of exchange. Often mountain biodiversity issues are being addressed in a piecemeal manner on a project basis, rather than mainstreaming and integration of biodiversity issues into other sectors in order to have a more far-reaching impact.

30. Similarly there is also a need for development and implementation of mountain-to-mountain, South-to-South and North-to-South cooperation programmes to exchange best practices, other information sharing and appropriate technologies.

Inadequate measures to mitigate global change, including climate change on mountain biological diversity

31. The melting glaciers, the shifting of natural habitats, and the retreat and sometimes disappearance of species are stark reminders of the vulnerability of mountain ecosystems to rising temperature and changes in precipitation and frequency of extreme events. Activities that link upland and lowland management strategies can provide adaptation options. These options, *inter alia*, include mountain watershed management, establishment of both horizontal and vertical connectivity migration corridors and transboundary mountain protected areas, rehabilitation of degraded ecosystems, avoiding deforestation, and a reduction in human pressure on biodiversity.