



Mountain to Mountain Cooperation Sustainable use of biodiversity, including genetic resources, in the Himal-Andes

12 - 30 June 2006

Report of an electronic conference organised by Mountain Forum in association with the Mountain Partnership, the International Centre for Integrated Mountain Development, and the HimalAndes Initiative.

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Detailed proceedings of this e-conference are available at <http://www.mtnforum.org/rs/ec/ha.cfm>

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Foreword



Andean flowers, Aconcagua region, Argentina. Photo: Agustina Barros

The e-conference, **Mountain to Mountain Cooperation: Sustainable use of biodiversity, including genetic resources, in the Himal-Andes**, (12-30 June 2006) represented a significant step in furthering inter-regional and intra-regional cooperation and of building new and strengthening existing alliances for sustainable mountain development within the framework of the Mountain Partnership. The Partnership - an evolving global network of countries, intergovernmental organisations and civil society - is committed to bettering the lives and livelihood opportunities and improving the environments of mountain regions around the world. At the Mountain Partnership Secretariat we were pleased to collaborate in June 2006 with Mountain Forum - a key member of the Mountain Partnership - to organise this important e-conference between regions which provided Partnership members as well as the larger international community as a whole with a platform in which to exchange experiences, knowledge and information about real and potential cooperation in biodiversity conservation. We appreciate this valuable contribution to regional partnership building and look forward to working together in the future to transform these words into concrete action on the ground.

Douglas McGuire

Coordinator, Mountain Partnership Secretariat



Alpine flowers, Yunan, China. Photo: Xu Jianchu

What a wonderful mountain feast of ideas we all had the pleasure to imbibe over the course of this exciting inter-regional e-conference, **Mountain to mountain cooperation: Sustainable use of biodiversity, including genetic resources, in the Himal-Andes**, June 12-30, 2006! No wonder the mountains are home to over 3,000 varieties of potatoes, to cite a classic example. And yet, the fact that this biodiversity has been so eloquently shared shows that mountains also have a common bond that links hemispheres together.

Almost 150 participants from over a dozen countries from both the Himalaya and the Andes and beyond, as well as organisational members of the Mountain Partnership and Mountain Forum signed up for this e-conference to interact and discuss key issues related to biodiversity and access and benefit sharing in the Himal-Andes.

These are challenging subjects that policy makers, scientists, community members and the private sector all have intense interest in - and for which there are not yet any easy answers. We have an awesome responsibility as people trying to help mountain peoples safeguard their natural heritage while continuing to share the genetic materials and improvements in husbandry that allow lives of dignity and sustainability. Even if there are no easy answers, it is clear that all future roadmaps will require continued exchange of ideas and information - and that the more we can work together the more we can assume some of these responsibilities and find innovative solutions such as the example of agrobiodiversity tourism.

We thank the Mountain Partnership Secretariat for their initiative and sponsorship as well as experts from the United Nations University and ICIMOD for their commitment with the background papers and moderation.

We thank the participating members of Mountain Forum and the Mountain Partnership for their excellent inputs, which are sure to serve as a springboard of future initiatives and collaborations.

We also thank Ranjana Sinha, our consultant-editor, for painstakingly poring over each and every background paper, posting, and case study, in order to synthesise the various strands of the e-conference discussions into a form that is readable and makes sense, and which you now hold in your hand.

J. Gabriel Campbell,
Chair of the Mountain Forum Board and Director General ICIMOD

Ana Maria Ponce
Executive Secretary, Mountain Forum Secretariat

Alejandro Camino
Director, HimalAndes Initiative

Glossary

ABS	Access and Benefit Sharing	masl	metres above sea level
AIATSIS	Australian Institute for Aboriginal and Torres Straits Islanders Studies	MENRIS	Mountain Environment and Natural Resources Information System
AIS	Andean Integration System	MYPOW	Multi Year Programme of Work
ASEAN	Association of South East Asian Nations	NBA	National Biodiversity Authority
BMC	Biodiversity Management Committee	NBSAPs	National Biodiversity Strategies and Action Plans
CAN	Community of Nations	NBU	National Biodiversity Unit
CAPs	Crop Awareness Programmes	NGOs	Non-Governmental Organisations
CBD	Convention on Biological Diversity	PIC	Prior Informed Consent
CMW	Celebrating Mountain Women	PPBA	Participatory Plant Breeding Approach
CONAM	National Council for the Environment	SARD-M	Sustainable Agriculture and Rural Development in the Mountains
COP	Conference of Parties	SBB	State Biodiversity Board
FAO	Food and Agricultural Organization of the United Nations	TK	Traditional Knowledge
FTA	Free Trade Agreement	TKDL	Traditional Knowledge Digital Library
GEF	Global Environmental Facility	TRIPS	Trade Related Aspects of Intellectual Property Rights
GNTB	Grupo Nacional de Trabajo sobre Biodiversidad (National Biodiversity Working Group)	UNU-IAS	United Nations University, Institute of Advanced Studies
HI	HimalAndes Initiative	WIPO	World Intellectual Property Organization
HKH	Hindu-Kush Himalaya	WTO	World Trade Organization
ICIMOD	International Centre for Integrated Mountain Development		
ILO	International Labour Organization		
INIAP	Instituto Nacional Autónomo de Investigaciones Agropecuarias		
INIEA	National Institute for Agricultural Research		
INRENA	National Institute for Natural Resources		
IPRs	Intellectual Property Rights		
IUCN-SUR	World Conservation Union's Regional Office for South America		
MARN	Ministerio del Ambiente y de Recursos Naturales		

Introduction



Crop field of quinoa. Photo: CONDESAN

The Himalayas and the Andes are gigantic geographical entities, each constituting massive mountain areas in their respective continents, critically influencing regional as well as global meteorological events, thereby determining distribution of natural resources as well as of ecological services accruing out of such resources. Both the mountain systems are repositories of high levels of biological as well as cultural diversity, which in turn, has been the foundation for the evolution of a rich ancestral heritage on the management of the agro-biological and other natural resources in both these areas. In spite of this parallel heritage, information exchanges between the Himalayas and the Andes have been woefully scanty and virtually no attempts have been made in the past at promoting cooperative endeavours which could benefit the inhabitants of these two mountain regions.

Despite experiences on the introduction of crops from one mountain region into the other, spanning at least three centuries, very little is known about the impacts of these introductions and much less perhaps, of the potential for a future systematic exchange of information and resources between these regions. The e-conference on **Mountain to Mountain Cooperation: Sustainable use of biodiversity, including genetic resources, in the Himal-Andes**, organised between 12-30 June, 2006 was an attempt, therefore, at identifying areas for partnerships that could be of mutual benefit for rural mountain communities both in the Himalayas and the Andes. The e-conference was the second formal exchange of information on conservation and sustainable development of both regions, the first being the HimalAndes Conference held at Kathmandu in December, 1999, where professionals and practitioners from both regions came together with support from Ashoka, Innovators for the Public, ICIMOD and the HimalAndes Initiative.

The e-conference in June 2006 was distinctive, however, in that it was the first HimalAndes Initiative e-conference. Under the active sponsorship of the Mountain Partnership Secretariat (based in FAO) and the organisation and facilitation of the

Mountain Forum Secretariat in association with the HimalAndes Initiative, ICIMOD and the Asia-Pacific and Latin-American nodes of Mountain Forum, this e-conference was opened up to all Mountain Partnership members, including those engaged in the Andes Initiative and the Hindu Kush-Himalaya (HKH) Initiative as well as the members and partners of Mountain Forum.

The e-conference was organised with the expectation that it would generate a valuable exchange of ideas, experiences and lessons learnt in the management of the two critical mountain regions of the world and help to strengthen existing alliances as well as create new ones to conserve and manage biodiversity, now and in the future. This e-conference, importantly, built on the various on-going activities of the Mountain Partnership members to learn from other models of development as well as to enhance dialogue and engage in a process of mutual exchange of experiences between the world's mountain regions, including the Carpathians, Balkans, Caucasus, and European Alps.

It is also important to note that this Mountain Partnership e-conference was a significant and timely contribution to the recently adopted work programme on mountain biodiversity of the Convention on Biological Diversity (CBD), which aims to establish '*regional and transboundary collaboration and the establishment of cooperative agreements*' and also recommends strengthening collaboration with the Mountain Partnership and regional conventions on mountains.

Although the present electronic exchange was primarily directed to the members of the Mountain Partnership from both the Hindu Kush-Himalayan and the Andean regions, it also invited participation from a much wider membership, spanning individuals beyond these two mountain areas. The e-conference, therefore, was an interaction involving contributors from the mountains and beyond with an intense interest in mountains and the welfare of mountain people. The e-conference focused specifically on the rich agro-ecological traditions of both regions and in the identification of avenues for future cooperation through partnership arrangements. The e-conference was conducted through four sessions with the

overall theme of cooperation, opportunities for exchanges, the normative and legal framework for establishing an Access and Benefit Sharing (ABS) mechanism, and prospects and challenges.

The first session, “The potential for cooperation in science, technology, policy, for the conservation of genetic resources, indigenous farming systems and sustainable development between the Himalayas and the Andes”, sought to review past and present exchanges and explore some areas with opportunities of mutual benefit. The second session focused on “Sharing Himal-Andes experiences and opportunities of technological innovations, socio-cultural adaptation, marketing, risk and opportunities in history and exploring future trends”. The third session, “The legal and normative framework for the use of biodiversity and genetic resources and the status of Access and Benefit Sharing (ABS) policies in the Himalayas and the Andes”, reviewed a critical dimension which has become a key pre-requisite to further a future partnership agenda. The fourth session, “Prospects and challenges for the institutionalisation of information exchange”, discussed options towards promoting a more systematic and enduring cooperation on information and resources exchange between both regions.

A synthesis of all the four sessions moderated by experts is presented in the e-conference report in two parts:

- the first dealing with conservation of genetic resources and indigenous farming systems for sustainable development of the Himalayas and the Andes, exploring the potential for South-South Cooperation through appraisals of past experiences and discussing the risks, opportunities and future trends; and
- the second dealing with the legal and normative framework for the use of biodiversity and genetic resources and existing Access and Benefit Sharing (ABS) regimes, discussing in the process the status of legal frameworks and the ABS regime in the countries of the two regions, key challenges for development of effective ABS regimes as well as the prospects for institutionalising knowledge and information exchange to strengthen South-South Cooperation.

Conservation of genetic resources and indigenous farming systems for sustainable development of the Himalayas and the Andes



Use of bamboo, India. Photo: Sanat K. Chakraborty

Exploring the potential for South-South cooperation - Past experiences, risks, opportunities and future trends

The Himalayas and the Andes, besides being the most significant mountain entities in Asia and South America respectively and thus, critical determinants of local, regional and global meteorological cycles, are also well recognised repositories of biological and cultural diversity. The interactive dynamism between cultures and the biological resources in their immediate environment influence each other intimately and in the case of these two mountain areas, has contributed significantly toward the evolution of a rich cultural heritage of management of natural resources for the well being of their respective inhabitants. In spite of this parallelism, it is surprising that instances of comparative research among the two mountain regions are scanty and attempts at cooperative endeavours that could benefit the inhabitants of both the regions have been conspicuous by their absence.

In spite of the geographical and cultural distance between the Himalayas and the Andes, they share many commonalities. Learning from each other's limitations, potentials, and experiences could result in mutual benefits. Strengthening the interactions between both regions could result in a successful cooperation in science and technology, particularly on issues related to conservation and sustainable development. This mutual support can contribute toward identifying successful experiences worth sharing. In addition, pro-active interactions between individuals of both regions will contribute toward improving mountain livelihoods. A comparative approach to the similar environmental and socio-cultural challenges could, therefore, help in identification of potential benefits that can result from promoting mutual knowledge on agro-biological action research, agricultural traditions, contemporary innovations, and sustainable development of rural environments. The following account attempts a compilation of views expressed by numerous participants in this regard and

reveals the wide range of possibilities that remains to be harnessed for the benefit of the mountain communities of the two regions.

Mountain to mountain exchanges: Past and present

The most well known and widespread crop introduction from the Andes has been the humble potato - a crop that today not only forms a common diet in almost all countries through out the world, but has also become an important cash crop in several countries. The global dispersal of potato as a crop paralleled the expansion of colonial powers and its introduction, though not intended specifically for the Himalayan region, has penetrated its culinary culture. As pointed out by Alejandro Camino in his background paper (see *Background papers*), within the Hindu Kush Himalayan countries, potato has been grown for over three centuries evolving into an important element in the diet of rural Himalayan communities and in the case of Bhutan, has been transformed into a major product for export. In a similar manner, maize and capsicum have been two other crop introductions from the Andes which have widespread distribution in the Himalayas and are integral components in the daily diet of Himalayan communities. These crops, as in the case of the potato, are also important cash crops that influence cash earnings of the rural mountain communities in the Hindu Kush Himalayan region.

Introductions of biological resources from the Andes have not been confined to crop plants only. Among the non-crop plants, the most famous import from the Andes - though surreptitiously - has been that of the quinine tree (*Cinchona officinalis*), until recently the only antidote to the dreaded scourge of malaria, common in the tropical jungles worldwide but particularly severe in the lower altitudes of the Central and Eastern Himalayas. Although this wonder drug has lost much of its effectiveness due to growth of drug-resistant strains of the malarial parasite, it remains even today, an important line of resistance in fighting the menace in many parts of the malaria-infested world.

Plants Originating in Mountain Areas

Region	Centre of Origin	Secondary Centre of Origin
Andes and Tropical Andes	potatoes, maize, tomatoes, the Andean amaranths, chenopods (quinoa), peanuts, cocoa, lupin, beans, cotton, quinine	bananas
Hindu-Kush Himalaya	carrots, mustard, gooseberries, apples, pears, apricots, oranges, lemons, large cardamom	barley, rice, rye, wheat

Table adapted from: IDRC Briefing - Mountain Biodiversity at Risk: Threats to Knowledge from High Places.

Introductions of biological resources from the Andes may have a longer history compared to reverse introductions into the Andes, particularly from the Himalayas. Introductions of different crops into the Andean systems probably started in the sixteenth century, prominent among them being wheat, barley and legumes. As in the case of potato, maize and other crops, most of these crops, however, were introduced from Europe although their origins lie in Asia. These crops may, therefore, constitute the early crop germplasm introductions from the Asian highlands. Documentations on crop introductions, specifically identifying the Himalayas or the Andes as the target area, are rare and difficult to come by; however, as Elisabeth Kerkhoff points out, present day cultivation, abundance and

use of crops such as *Sechium edule* - known as *iscus* in Nepal and *choyote* (or *christophine*) in the Andes - suggests that there have been instances of such exchanges. A second example that Kerkhoff mentions is that of *Mormordica muricata*, commonly known as the bitter melon, introduced into Brazil from the Old World. Nakul Chettri and Krishna Oli, among others, provide instances of introductions from the animal world. Chettri cites the case of the common chicken and states that the origin is from the Red Jungle Fowl (*Gallus gallus*), native to the Eastern Himalayas. Thapa and Sharma in their background paper (see *Background papers*) provide an informative tabulation of the different crops that lists the Himalayas or the Andes as their primary or secondary centre of origin. This tabulation provides a useful guidance in regard to

Historically (and recently) introduced crops in the Himalayas and the Andes

Potato	Potato originated in the Peruvian Andes. The discussion on the exact number of different varieties of potatoes in the Andes fluctuates from 50 to 300 and the issue has to do with the criteria for determining a variety. In the Himalayas, potatoes have now been sown for over 300 years and have not only become a vital food crop, but in some cases, a major export crop as well.
Maize	Corn is said to have originated from the Sierras of Mexico (although this is still a matter of controversy, with claims of a simultaneous second place of domestication in the Andes). In the Himalayas, maize has been sown for over 300 years and has become an important food crop.
Quinoa/ Quinoa (<i>Chenopodium quinoa</i>)	Quinoa has been cultivated in the Andes since around 3,000 B.C. as a staple food crop. In Peru, Chile and Bolivia, quinoa is still widely cultivated for its nutritious seeds, as well as for medicinal purposes. It has been grown outside of South America for a relatively short time but since the 1980s, seeds have been distributed to agronomists in North America, China (Tibet) and in nine mountainous countries of Africa and the Hindu Kush-Himalayas. In India, it has been experimentally grown in certain areas of Uttar Pradesh.
Oca (<i>Oxalis tuberosa</i>)	Oca is also one of over two dozen crops first domesticated in the Andes. It is cultivated at high altitudes in the central Andes, mostly in the highlands of Ecuador, Peru and Bolivia (Emshwiller and Doyle, 1998). It has been experimented in certain areas of Uttar Pradesh, India. The germplasm of oca (as well as of other Andean tubers such as <i>Ullucus tuberosus caldas</i> and <i>Tropaeolum tuberosum</i>) have been sent to Nepal and are currently under trial for growing in the Himalayas.
Rice	Farmers in Nepal cultivate approximately 2,000 different varieties of rice, and upland rice varieties from mountainous Nepal have been sowed experimentally in the Andes of Cajamarca, Peru.
Buckwheat	Buckwheat varieties from Nepal have been sowed experimentally in the Andes of Cajamarca, Peru.

(Source: Thapa and Sharma's background paper, see *Background papers*)

tracing the origin of some of the introduced crops and helps in determining whether a particular crop, now cultivated universally, actually originates in these regions or not, and hence, falls within the gamut of the present discussion.

Unlike the crop exchanges outlined above, all of which gradually resulted in a mountain to mountain introduction more by default than anything else, targeted mountain specific introductions are of recent phenomena. In the mid-nineteenth century, stocks of Darjeeling tea had been introduced in the eastern slopes of the Peruvian Andes and today, as noted by Camino, has proved to be a major commercial success having

graduated to an export product. Of similar significance has been the spread of monocropped paddy cultivation particularly into the eastern Andean slopes. More recently, cardamom (*Amomum subulatum*) and the Asiatic seabuckthorn (*Hippophae sp.*) have been successfully introduced in the Andean region. Similarly, buckwheat from Nepal has been experimentally tested in the Peruvian Andes. Although the extension of these recent introductions into the Andes may not have been as dramatic as that of tea or paddy, the success of their performance holds potential for further expansion and thereby, for improvement in the economic upliftment of the Andean communities.

Experimental trials of Andean crops have also been conducted in the Himalayas since the early nineties. Of these, the most well known is that of Quinoa (*Chenopodium quinoa*), cultivated in Peru, Chile and Bolivia for its nutritious seeds and medical properties. Quinoa seeds have been introduced in several parts of the Himalayan region, prominently China (Tibet) and in Uttar Pradesh, India. Similar trials are being conducted with Oca (*Oxalis tuberosa*), a tuberous crop native to Ecuador, Peru and Bolivia. Oca, together with other Andean tubers (*Ullucus tuberosus caldas* and *Tropaelum tuberosum*), is currently undergoing trial in Nepal. Many of the Andean crops are also under experimental trials in the Tibetan plateau under the aegis of the Tibetan Academy of Sciences. Thapa and Sharma summarise the important exchanges between the two mountain regions providing a glimpse of the historical perspective of the mountain to mountain crop exchanges while Camino details the initiatives taken in more recent times.

Mountain to mountain exchanges: The realised and potential impacts of crop introductions

Crop introductions, whether from the Andes to the Himalayas or vice versa, have taken place both by default as well as by conscious intent in the historical as well as recent past. Although the impact of introductions has been limited in many cases, as pointed out by Hubert Zandstra, one has to look at the history of potato introduction into Europe and subsequently the rest of the erstwhile colonial empires to get a measure of the diversity of benefits that await such introductions. The introduction of quinine as a plantation crop in South East Asia and the south eastern slopes of the Himalayas is another example of cumulative benefits that accompanied crop introductions. In fact, as Camino points out, the colonial powers of Europe - British, French and Belgians - owe much to this Andean resource for their unfettered expansions into large parts of tropical Africa and Asia. Without the 'discovery' of the miraculous powers of this plant to fight malaria, extensive colonisation of these tropical regions would not have occurred. The cumulative benefits accruing to pharmaceutical industries as well as humanitarian benefits accruing to those infected by malaria on account of this wonder plant have been immense. The papers by Camino, and Thapa and Sharma (see Appendix) point to the benefits and the importance of increasing crop and genetic diversity of introduced species in the farming systems of these regions.

While the economic benefits of crop introductions to the world at large have gradually become obvious, particularly in the case of crops such as potatoes, coffee and tea and non-crop resources such as quinine, the potential benefits to the mountain populace - both in the place of origin as well as in its new home - remains an area yet to be fully explored. Crop introductions have often been market driven, or at least the expansions and incursions into new areas are motivated by market demands. Mountain communities, as Camino points out, have historically and through empirical experience, depended on crop diversification as a time tested risk reduction strategy. The conversion of mixed cropping systems into monocultures of cash crops has had adverse impacts on the risk aversion ability



Chetilla market, Cajamarca, Perú. Photo: Elias Mujica, CONDESAN

and hence, often increased the vulnerability of rural communities, particularly the poor. Unfortunately, very little documentation exists on this aspect of introductions and as Camino notes, it is important to conduct an in-depth assessment of the impact of such introductions on the long-term livelihood security of mountain communities, both in the place of origin as well as the area of introduction.

Emphasising this aspect, Camino highlights the plight of farmers in the eastern Andean slopes whose dependency on rice monocropping has made them impoverished, malnourished and also degraded their hitherto mixed farming systems. He attributes this undesirable plight to the shortsightedness in crop introductions. Elaborating the case, Camino explains that ancestral Asian traditions combined rice cultivation with aquaculture, particularly fish and shellfish farming. The ancient systems of paddy cultivation are part of a more complex strategy of diversification involving several associated crops such as millet, soybeans and vegetable combined with fish, crayfish and mollusc farming. These systems evolved in response to diverse needs and the gradual trend toward intensification. Such complex systems also reflected the growing harmonisation of resources with increased demands and optimisation of resource use. Crop introductions bereft of the associated traditional knowledge and practices more often than not, increase the vulnerability of communities adopting the new crop. It is, therefore, critical that such introductions are not only confined to the biological resource, but should also include a complete package which encompasses the cultural knowledge associated with the resource.

The transfer of traditional knowledge and practices as an integral package in crop introductions is critical not only to minimise associated risks and vulnerabilities but also to ensure that the full potential of the introduced crop is realised. The lack of knowledge results in under utilisation (sometimes, even misutilisation) of introduced crops. This is typified by the utilisation of some nutritious crops, native to the Andes, as fodder for livestock in the Himalayas. The importance of the transfer of the native knowledge related to the use, such as the nutritional values of the introduced species, including their diverse culinary uses, is often overlooked. Thapa and Sharma assert that the introduction of the crops and



Farmer of Kiwicha in San Salvador. Photo: Musuq Briceño, InfoAndina

their associated agricultural technologies must, therefore, include traditional knowledge and practices.

Often overlooked is the fact that introducing a crop usually fails to deliver the kind of genetic diversity found in its originating place. The narrow amplitude of diversity could often render the introduced species ineffective in adapting to the new environment and thereby severely limit its performance, ultimately making the introduction fruitless. It is important, therefore, to bear in mind the necessity to ensure a fairly diverse germplasm trial in the new environment in order to select the most appropriate variety before full scale crop introductions are executed. As in the case of risk reduction discussed above, traditional knowledge about the performance of different varieties, their specific micro-environmental needs as well as their variegated attributes becomes an important component of successful crop transfer initiatives. In order to realise the full potential of such exchanges, it is critical therefore, to include the knowledge base associated with any crop as an integral part of the exchange.

Mountain to mountain exchanges: Potential opportunities for future interactions and exchanges

Himal-Andes exchanges and cooperative endeavours to date are grossly disproportionate to the potential opportunities that remain unharnessed, given the commonalities and parallel cultural evolutionary trends among the two entities. Past initiatives in this regard have been limited and have centred narrowly on crop introductions. Mountain civilisations, particularly those in the Andes, are known as ‘agro-centric’ civilisations primarily due to their being instrumental in domestication of a number of crop varieties and with the gradual evolution of the constituent societies, the parallel evolution of a rich heritage of the use and management of their natural resources. This interactive dynamism has given rise to a unique inheritance that in the present context, Erick Pajares terms as ‘culturally created biodiversity’. Pajares emphasises the importance of considering and understanding that beyond the “differences between both the regions and the shared socio-cultural characteristics” the common

denominator to both geographical spaces is that they are ‘bio-cultural areas’ inhabited by agricultural conservationists who have developed a system of creativity and permanent recreation of traditional knowledge associated with agro-biodiversity. This recognition, in his consideration, is fundamental to fortifying the process of cooperation between the Himalayas and the Andes.

Physiographic attributes - particularly those of slope, aspects and altitude - contribute primarily to the diversity of terrain in both the mountain systems. These attributes, together with pedological and hydrological variables, determine the physico-chemical characteristics of the diverse micro-habitats and thereby, regulate the type and variety of vegetation found within the Andes or the Himalayas. An important variable that has an over-riding influence on vegetation types and distribution in both the cases, however, is that of latitude. This is dramatically reflected in the Andes, exemplified by the so called ‘thermal floors’ of Colombia where the climate and temperatures remain almost constant throughout the year and the only variation in these are a function of altitude. These ‘thermal floors’, as Oscar Tosse and Maria Fernanda Escobar point out, host different ecosystems and micro-climates and hence have the capacity to produce throughout the year, giving rise to diverse cultivars as well as different crops, the most well known and valuable of these being the famed Colombian coffee.

While the latitudinal span of the Himalayas is not as wide as that of the Andes, its influence on vegetation distribution patterns is dramatic nonetheless, giving rise to a higher snowline in the Eastern Himalayas which lie in the lower latitudes. Higher snowline translates into a proportionately larger area suitable for vegetation and with the combined influence of altitudinal variation (and thereby, the variations in climatic regimes), gives rise to a wide range of ecosystems which otherwise would have remained as snow covered barren expanses. The overall consequence of all these variables is the diversity of biological wealth, many of which are endemic to the Himalayas or the Andes.

The diversity of biological resources, particularly the variety of plant life forms arising with altitudinal and habitat variations, together with the pressures of terrain and climate, have fundamentally determined the evolution of diverse subsistence strategies of the mountain communities in both the Himalayas and the Andes. The interactive dynamism between cultures and their immediate biological environments has shaped the traditional knowledge of mountain communities and with each passing generation, evolved into a rich and diverse knowledge base, robust enough to give rise to a rich heritage of domestication, use and management of a plethora of individual species as well as the development of complex multi-species and integrated production systems. The evolution of this knowledge and the understanding of interactions is reflected in the complex home gardens mimicking natural systems, “garden like terrace farming of associated crops”, in paddy-cum-fish culture, in the agro-pastoral systems of the Andes as well as in the complexity of crop diversification, fallow management and resource management at the landscape level as seen in shifting cultivation, practiced by many communities in the mountain regions. It is not surprising, therefore, that communities in these mountain regions have been recognised as “agro-centric” civilisations.

Crop diversification as a risk reduction strategy among shifting cultivators of North East India

A fundamental characteristic of shifting cultivation systems in North East India is the rich diversity of crops found in each farmer's field. Each field is a repository of both inter- as well as intra-specific crop diversity. Shifting cultivation fields in most locations of NE India are a collection of cereals, legumes, tubers, spices, oil seeds and a myriad of leafy vegetables. Researchers have enumerated as many as forty to fifty different crops in a given field, particularly in the states of Nagaland and Manipur. Within crops, several varieties (or landraces) are found in the fields, each selected and cultivated to suit a specific micro-habitat. Shifting cultivators consciously select, nurture and conserve the germplasm of each crop for its short-term as well as long-term risk reduction potential (and hence, are custodians of this rich agricultural germplasm). The reflection of this pattern of mixed cropping or 'associated crops' can also be found throughout the eastern slopes of the tropical Andes.

Harvesting of the crops is carried out sequentially throughout the season and thereby, the farmers have several crops available for their consumption needs. Harvesting commences from the month of May or June (depending on climate and maturity of the crops) and continues till November, when the final crop - mostly rice - is harvested. The sequential harvesting implies that farmers have food availability throughout the year. Even during the lean months of March to May, there are at least two or three crops available. Shifting cultivation may be a subsistence production system, but the diversity of crops and the sequential harvesting ensures that shifting cultivators do not starve and that basic food and nutritional security is

assured. With reduction in fallow cycles, productivity of these systems has reduced drastically, but food insecurity is confined to cereal crops only. This trend can also be observed in the eastern part of the central Andes.

The rich diversity of crops is a strategy evolved to avoid several risks. The mixed cropping in the field contributes to reduction of pests and pestilence - although no scientific research has been carried out on this aspect. The fact that almost no incidence of pest outbreaks has been reported from such systems suggests that mixed cropping reduces (i) the chances of pests finding their host plants, and (ii) even if pest infestations do start, the dispersal of pests is confined, as host plants are distributed randomly in the field as in the case of sedentarised monocultures.

The diversity of crops (and the various landraces) ensures that even if crop failures happen due to adversity of climate (unusually heavy monsoon showers, hailstorms or drought), few of the landraces of each crop type (cereals, legumes, tubers, spices) will have the resilience to survive. Farmers will not be faced with a total crop failure. Ensuring crop diversity, therefore, allows shifting cultivators to avoid the risk of starvation and crop failures. Shifting cultivation may have limitations in regard to affording shifting cultivators cash returns as in the case of sedentarised cash crop farming systems, but the system guarantees shifting cultivators an insurance against total crop failures and the possibility of starvation and abject poverty. Interestingly, this situation can be seen in the eastern tropical Andes as well.

(Editor's note: This information has been compiled from available publications for the benefit of readers and its relevance to the section. Inputs for the Andes have been provided by Alejandro Camino.)

The heterogeneity of habitats, consequent to the attributes of physiography and terrain of both the mountain systems, can form a formidable constraint to attempts at extensive introduction of crops and severely limit crop expansions even when market forces favour such crops. However, as both Joshi and Camino point out, this limitation has its inherent advantages as well. The most obvious manifestation of this heterogeneity is the possibility for the diversity of niche products. The wide variation of climate, pedological and hydrological regimes- products of varying terrain, aspects and altitude - found within the two mountain systems are responsible for the unique attributes characteristic of the native crops and associated resources. While commenting on this aspect, Joshi points out that although the mountains lack the potential for bulk production, this limitation is more than offset by the potential for quality production. Fruits, vegetables and crops of the mountains possess distinct tastes, fragrance and nutritive value and these attributes more than compensate for the limitation for bulk production. He highlights the case of mountain cucumber, radish, maize, gourd, myriads of citrus and the buckwheat. Although many of these crops are also found in the plains and lowlands, particular attributes of the same crops are distinct in the mountains and set

them apart from their plains counterparts, giving them a unique niche dimension.

Mountain entrepreneurs marketing mountain products have failed, however, in capitalising on this unique disposition. Mountain products, despite having distinct flavours, fragrance or attributes, have always been equated in the same way as products from the plains and hence, marketed as such. The failure to pro-actively promote mountain products as unique and distinct from others - as niche products - has not only undervalued such products but has also failed to 'brand' them as exclusive and hence, missed out on the opportunity to generate incremental returns which otherwise could potentially, have been substantial. Joshi emphatically underscores this aspect and emphasises the need to capitalise on this untapped opportunity.

Joshi's observations are reiterated by Camino who cites the growing demand in Lima's supermarkets for native Andean potatoes, ancient varieties known for their taste and nutritive quality and valued at prices higher than the 'improved varieties'. The niche opportunity is further compounded, notes Camino, by the opportunity for growing off-season crops. The economic advantages of being able to supply vegetables in the off-season is multiple and in the case of the mountains, given the diversity of habitats and the variation in climatic conditions brought about by altitude and latitude, could

The diversity of integrated systems in North East India: Knowledge repositories of sustainable management of biodiversity and landscapes

The interactive dynamism of communities and their immediate environment has given rise to sustenance strategies which have evolved gradually into complex, integrated production systems utilising the natural resources available within the immediate surroundings of communities. The management of such systems is often governed by customary norms, the frameworks of which determine access, control, use and management of the resources for the benefit of individuals benefits as well as that of the community at large. Examples of such systems are common in the uplands of the Eastern Himalaya, particularly the northeastern region of India and these offer a rich repository of knowledge and experience which could be emulated by many mountain communities as well as the world at large. The documentation and mapping of this rich knowledge base and the practices embedded in each could contribute profitably to the South-South Cooperation and Mountain to Mountain exchange.

Among the sedentarised systems, the paddy-cum-fish culture of the Apatanis of Arunachal Pradesh offers a unique blend of integration of crop production, aquaculture, water and waste management as well ecosystem conservation that simultaneously supports livelihood needs and ensures sustainable management of natural resources. The Apatanis practise wet rice cultivation, or *aji*, in their saucer-shaped valley integrating this with pisciculture. Wastes from the villages are channelised through the complex irrigation system, thereby addressing both waste disposal as well as ensuring regular nutrient inputs for the crops. Associate crops such as millet, soyabean and leafy vegetables are grown on the bunds separating the fields, thus promoting diversification of crops. The slightly elevated land surrounding the paddy fields is utilised for rainfed agriculture and a variety of crops are cultivated in these fields, the most important among them being maize. Each Apatani household has two more production systems in their overall life support system. The first is the kitchen garden, or *balu*, where a wide variety of seasonal vegetables are grown for household consumption and the second, their individual bamboo gardens, known as *bije*. The latter is used for nurturing bamboo as well as other tree species important for house-building, furniture and fuelwood. Private forests, individually owned and known as *sansung*, are also common and these are found in the periphery of the valley. The catchments surrounding the valley are forested and these are owned by different clans who ensure that the forests are completely protected as these are critical for ensuring an uninterrupted water flow feeding the numerous streams which form the water source for the Apatani irrigation system. These clan forests are known as *more*.

The *zabo* system of the Chakesangs of Nagaland constitutes another example of systems integration and resource management at the landscape level. Chakesangs conserve catchment forests as a rule to ensure that the water sources never dry up. Catchment forests are owned by the clans and each clan ensures effective protection. Livestock is an integral part of Chakesang production systems; the cattle are collectively stalled and grazed and this is done in designated meadows just below the catchment forests. The washings from the cattle sheds, together with the dung and urine are channelised into the streams passing through the meadows and this enriched water is then directed into the irrigation waterways that flow through neatly stacked terraces cut out of the mountain side, thus providing rich nutrients essential for the paddy that the Chakesangs grow in their terraces.

The most complex system of integration, however, is that seen in shifting cultivation, or *jhum* practiced by a majority of the upland communities in northeast India. Shifting cultivation



Shifting cultivation, India. Photo: Sanat K. Chakraborty

integrates agriculture and forestry, practiced in the same space, but separated in time. Regeneration of the agricultural fields is ensured through the natural regeneration of forests, in some cases spanning over thirty to forty years. The agricultural phase is characterised by a rich crop diversity, with legumes forming an integral component of the crops. Nutrient enrichment, moisture and soil conservation are ensured through a unique system of weed management where approximately thirty per cent of the weeds are left in the field during weeding.

To ensure regeneration of the forests during fallowing, shifting cultivators retain trunks, stubs and the roots of many tree species which regenerate as the cultivation proceeds and the fields return to fallows. A study in Manipur reveals as many as seventy five tree species being retained in shifting cultivation plots; most of these species are nurtured because the farmers know about their regenerative capacity and have utility value. Shifting cultivators, therefore, not only ensure conservation of agro-biodiversity, but also manage many species of trees that have utility and ecological value.

Fallow management in shifting cultivation, therefore, contributes to the regeneration of secondary forests with an impressive diversity. The mosaic of different aged fallows ensures the management and conservation of young and productive forests. Shifting cultivators, therefore, are not just agriculturalists or foresters: they can justly claim to be custodians of a rich, diverse agricultural germplasm as well as resource managers at the landscape level.

(Editor's Note: This compilation is based on publications of different workers, the most well known being Prof. P. S. Ramakrishnan of Jawaharlal Nehru University, New Delhi and Dr. Dhruvad Choudhury presently at ICIMOD, Kathmandu.)

offer the comparative advantage that is so critically required for enhancing mountain livelihoods and economies.

Sharma and Banskota, while endorsing such observations, also point out that mountain agriculture, particularly in the Himalayas, is, by default, organic. This by itself extends the opportunity of branding mountain products as organic and niche, and hence in capitalising on market dividends that will benefit the mountain farmers. They also note that lesser known agricultural crops have the highest diversity and germplasm in the mountains. These crops are highly nutritious and form important components in the local cuisine. Such crops offer untapped potential and could significantly contribute to local economies if properly promoted and branded, particularly through ecotourism. This then, would not only contribute to livelihoods and local economies, but by their wider cultivation, also contribute to conservation of agro-biodiversity in the mountains.

While dwelling on potential opportunities arising out of the habitat diversity in the mountains, Joshi introduces an interesting concept in regard to crop introductions and the impact that the new environment may have on introduced varieties. Reiterating Camino's assertion for intensive monitoring of performance and adaptations of the introduced crops in their new environment, Joshi suggests that the possibility of the introduced crop adapting to the new conditions and evolving attributes and characteristics totally different and novel from that in its native habitat cannot be ruled out. In the process of adaptation, the texture, taste, fragrance and to a certain extent, the nutritive value of the introduced crop may lead to a favourable change and thereby, give rise to a unique niche product that arises in the new environment. Thapa and Sharma confirm this phenomenon and cite the example of corn and potato found in the Himalayas that are totally different from those found in Europe or in South America. Joshi suggests that non-profit agencies should experiment and monitor such attempts to capture positive and favourable changes which if found, should then be harnessed for the benefit of the poor and disadvantaged section of society in both the mountain regions and thereby, ultimately contribute to the well-being of mountain societies at large.

Joshi raises another aspect that merits serious investigation in the context of mountain to mountain exchanges involving crops. The Himalayas and the Andes are home to multiple cultures and ethnic groups, each with its own, often distinct food habits and preferences. Communities in both the region have a wide resource base and are known for their use of and dependency on biological resources, particularly plant resources. Variations exist in regard to what is considered edible and non-edible both within each region as well as between them. Joshi sees a tremendous untapped potential in this knowledge that needs to be investigated intensively and thereby, tapped for the overall benefit of communities in both the mountains as well as outside. Such investigations, founded basically on traditional use and knowledge of edible plants, could mutually benefit communities in the mountains and may, potentially, contribute to nutritional enrichment and health

Promotion and branding the unique attributes of mountain crops: An imperative to avoid undervaluation

Many fruits, vegetables and crops of the mountains have distinct taste, fragrance and nutritive value. However, mountain produces, more particularly Himalayan products, have always been undervalued and this may also be true of the Andes. The Himalayan mountain cucumber (*kakri*) is a case in point. It is entirely different than the cucumber that we get in the plains - fairer in colour, larger in size and with a unique fragrance, it would be apt to call it musk cucumber. Its unique value is not promoted and hence the price that it fetches is always inferior. It needs to be branded for its value and promoted as a distinct product to the outside markets. Similarly, the Himalayan mountain radish (*mooli*) is larger and has a distinct flavour when compared to those from the plains. The list is endless - mountain maize, gourd, lemon and myriad citrus fruits like orange, malta, lemon, etc are fruits of value but have never fetched the price they deserve due to improper marketing and the failure to promote them as branded and niche products. *Koda-mandua* (buckwheat) has its own tale to tell. It has a black coloured grain which is adapted to the mountain environment and is considered to be of great value for diabetic patients. Such products from the mountains are not promoted or marketed as unique and possessing distinct characteristics and hence, are undervalued. These products are organic and of high quality. The sweetness of mountain maize, the fragrance of mountain cucumber, the sugar-free value of the buckwheat have never been recognised as commodities of value and distinct from their counterparts in the plains in marketing and consequently, mountain farmers have been permanent losers.

(Source: Prof. P. C. Joshi, Department of Anthropology, Delhi University, Delhi.)

improvement efforts ongoing in both regions. Joy Das Gupta adds another dimension to the context of knowledge repositories as he draws attention to the linguistic diversity of mountain communities. Languages are storehouses of ecological knowledge and indicate the interactions past generations have had with their resource base and the nuances of languages reflecting the richness of experiences embedded in each community. Linguistic diversity, therefore, merits investigation to unravel the rich repositories of knowledge available within each community and concerted efforts to conserve this rich legacy.

Arguing in a similar vein, Juan Carlos Ronquillo raises the issue of feed and forage for livestock management. Livestock form a critical component in livelihood activities of mountain communities and as emphasised by Netra Prasad Osti, are an integral part of the mountain economy. The failure to lay adequate importance to this fact has resulted in land degradation and economic deprivation. Inappropriate introductions, particularly of exotic livestock species, have brought short term solutions but spawned several undesirable long term outcomes. Livestock improvements have involved not only exotic breeds of cattle, but such introductions have necessitated the introduction of forage crops as well. The introduction of the latter, while addressing the issue of feed and forage for the exotic breed of cattle, has exacerbated resource depletion, particularly of local forage species as well as of forests.

Ronquillo highlights the negative impacts and outlines the chain of events that lead to environmental degradation. Citing the results of a three-year study, he concludes that the lack of technical support and advice about forage needs of exotic breeds has resulted in the usage of improper forage which are poor in nutrients thereby affecting yield. This forces farmers to develop forage patches for



Andean flowers, Aconcagua region, Argentina. Photo: Agustina Barros

fodder and as needs increase, the farmers are left with no option but to encroach on and transform forested areas, ultimately resulting in depletion of bio-resources. Ronquillo observes that the potential of local resources remains untapped due to inadequate research and attention given to them. He suggests strengthening investigations on local resources, taking local communities as partners in research so that the larger efforts of improved production from mountain systems can benefit from local knowledge and thereby contribute to the reduction of pressures on mountain resources as well as to the long-term improvement of mountain economies.

Mountain to mountain exchanges: Risks and caution – lessons from past experiences

In the enthusiasm for affecting exchanges and cooperation between the Himalayas and the Andes, it is necessary to exercise some restraint in order to avoid risks and ensure that exchanges, particularly the introduction of bio-resources, do not result in negative impacts and hence, prove counterproductive in the long run. Eklabya Sharma sets the tone and points out the need for being cautious during crop introductions from new environments in order to avoid the inadvertent introduction of weedy species together with new crops. This caution is reiterated by Thapa and Sharma in their background paper as well as by Laxmi Prasad Pant, who cites the case of *Eupatorium adenophorum*, locally known as *Banmara* (or forest killer) in Nepal. Thapa and Sharma also point out that in certain cases, the introduction of new and varied species of crops and their cultivation has resulted in the depletion and in some instances rapid loss of traditional varieties. Pant agrees with Thapa and Sharma and explains that introduced crops often outperform local crops, primarily because the former are shorn from the pressures of pests, diseases and competitors that are normally associated with the crop in their native habitats. Pant cites the example of the pole (climbing) bean introduction in Rwanda and its out-performing the local bush beans. This aspect is reaffirmed by Camino, citing the example of paddy introduction and its extensive expansion in the formerly forested tropical slopes of the Central Andes. The extensive expansion of paddy has been at the cost of the loss of tropical forests and the associated biodiversity, creating vulnerable ecosystems and

giving rise to environmental and social problems. The promotion of rice monocultures has transformed managers of traditional diversified farming systems into farmers dependant on a single crop, eroding their risk aversion capability - and hence, their self reliance - rendering them into vulnerable peasants totally at the mercy of market fluctuations.

Netra Prasad Osti, while welcoming the efforts for exchanges between the mountains, raises two important concerns. Mountain communities, he points out, are managers of integrated production systems, particularly agriculture and livestock. The failure to maintain this integration by overemphasising one at the cost of the other, results in upsetting the delicate balance inherent in mountain production systems, causing not only the impoverishment of the systems and the practitioners, but also contributing substantially to the depletion of natural resources and thereby to environmental degradation. Osti brings out another interesting aspect of the synergistic negative externality of 'development' and crop expansions. Development of roads and transportation systems while positively contributing to addressing inaccessibility and remoteness brings about an undesirable element that is often overlooked but is silently overtaking most mountain communities. He cites the example of maize and soyabean. As transportation improves in the mountains of Nepal, maize and soyabean - hitherto staple food crops of mountain communities - are gradually being replaced by rice and other legumes. Maize today is losing its importance as a

The invisible health risks of promoting off-season vegetables

Most vegetables are seasonal and have genetically evolved to mature during particular seasons. Economic opportunities and market forces have nurtured modifications so that many vegetables today are biologically engineered and manipulated to grow throughout the year, or in the months they would normally be unavailable. It is common today to buy tomatoes almost throughout the year, even during the months when they would otherwise be unavailable. While the ability to supply vegetables during months of normal unavailability definitely affords an economic advantage to growers, this has potential health implications. The fact that certain vegetables are found during particular seasons implies that nutrients - micro as well as macro - will be seasonally derived through their consumption. However, if these nutrients were to be inducted into our systems because of the consumption of vegetables and fruits not normally found in that season, this could result in excess intake of constituent nutrients. The health implications of this are unknown, but prevailing wisdom suggests that this may not be desirable. The growing incidence of increased uric acid levels and associated disorders may very well be linked to the availability and consumption of tomatoes and beans - which are known to exacerbate uric acid and kidney stones - throughout the year. Leafy vegetables belonging to *Cruciferae* are normally available in winter; however, these vegetables are also grown in summer with the promotion of off-season vegetable cultivation. These vegetables lose their flavour in summers and are prone to pests and pestilence. It is necessary to ponder why cucurbits are juicy and cool and flourish only during summers while winter vegetables such as cauliflowers and cabbages are not as succulent! The water requirement in summers is obviously higher and perhaps this is the reason why cucurbits, normally found only in summer months, are so succulent. As off-season vegetables may pose potential health risks, the compromise perhaps, is to encourage early- and late-season vegetables, rather than off-season vegetables.

(Editor's note: This note has been included, at editor's discretion, since in our enthusiasm for finding immediate options for securing livelihoods, we often overlook the long-term undesirable health implications which are not always obvious.)

staple and is increasingly being used as a fodder crop. This scenario is not peculiar to Nepal, but is a common phenomenon across the Himalayas. In the process, many mountain crops today are severely depleted or have already reached the stage of extermination.

Focusing on the negative externalities associated with crop introductions and the process of gradual extermination of species that Thapa and Sharma, and Camino highlight in their respective background papers, Oli raises the case of the Himalayan black breed of pig. The breed, because of its diminutive size, is particularly well suited to the mountains. The small size also implies less input requirements and hence, can be reared even by small farmers. In contrast, exotic breeds require higher inputs, are unsuited to the cold climates of the mountains and hence, are inappropriate. Despite the inappropriateness and higher mortality rates, introduction of exotic breeds has been extensive, particularly in the Eastern Himalayas, primarily due to the higher yields of meat. This, however, has resulted in the gradual extermination of the native breed from these areas. As Yolanda Ortiz points out, the fundamental message that needs to be kept in focus while facilitating exchanges and germplasm introductions - be it plants or animals - is that given by FAO, which says "The main causes of genetic erosion are the substitution of varieties and local races, the clearing, the excess of species, the advance of the farming borders, the environmental degradation".

The most critical aspect in this context, however, is the long-term impact on livelihood security and vulnerability of the marginalised mountain communities. Despite the history of crop introductions, particularly those with commercial possibilities such as tea and coffee, intensive monitoring and evaluation of long-term impacts of such introductions on livelihood and vulnerability aspects are conspicuous by their absence. As Camino points out, the impacts in many cases can be alarmingly negative, transforming production systems and depriving farming communities of their self reliance, rendering hitherto vibrant systems into impoverished entities and the communities into marginalised and helpless people. The caution required in future initiatives of mountain to mountain exchanges, therefore, has to do with keeping the negative impacts centre-stage in order to avoid the pitfalls that can be detrimental to mountain societies and, hence, need to be avoided at all costs.

Mountain to mountain exchanges: Opportunities for South-South cooperation – the way forward

Inter-dependency of countries on crop plants, opines Balakrishna Pisupati, has been historical. Quoting Martin Luther King who said "half of the world's plant diversity is on my breakfast table!", Pisupati remarks that with their environmental, cultural and social diversity, the Himalayas and the Andes stand to gain from their potential to exchange resources and information for the betterment of their inhabitants. He believes that identification of emerging opportunities in terms of technology transfers and cooperation could help both the regions and that they need to be linked



Vegetable market, Pokhara, Nepal. Photo: Zbigniew Mikolajuk

through a 'knowledge partnership', addressing innovations that are economically attractive, socially relevant and environmentally friendly. This cooperation needs to be fortified by making market linkages stronger through private sector partnerships which can be nurtured as a better understanding is gained from appropriate examples of how certain crops have gained wider acceptance while others have not. He cites the example of coffee, which at one time, was perceived as the Devil's crop, but today, is one of the most important cash crops with an industry with sales approaching USD 70 billion per annum and ranks second only to oil as the most valuable legally tradable commodity.

This view is reflected by many and as K. N. Vajpai suggests, the opportunities for an Himal-Andes exchange are many. In addition to crop exchanges, Vajpai points out that a promising candidate for cooperation where the expertise and knowledge can be transferred from the Himalayas, particularly Nepal, is that of micro-hydels. Camino supports Vajpai and adds that perhaps micro-hydels and hydro-power technology can be an ideal candidate for including the private sector in this initiative for South-South Cooperation. Camino makes an important point in this regard when he observes that given the structure and forces of international aid, the flow of exchanges has historically been between the North and South. Although governments in the South often are constrained in their abilities to orient the flow of exchanges in a South-South direction, it is time that opportunities were explored and initiatives taken for strengthening the South-South cooperation.

Hubert Zandstra, while supporting the call for a stronger South-South exchange, appeals for a reduction in rhetoric and formulation of a practical and pragmatic action framework. He pleads for a strong focus on practical solutions and a reduction on the tendency to dwell unduly on the complexities and limitations. Setting the tone to his plea, Zandstra offers a framework with regard to crop introductions. Admitting that evaluation of exogenous crops is difficult and tedious, he nonetheless emphasises that such introductions will require an intensive assessment starting from the production systems and gradually moving up the chain from producers' inputs to consumer usage.



Vegetable market, Tibet, China. Photo: Agustina Barros

Ritu N. Budakoti points out that given the overriding influence of market forces and the rapidly growing aspirations of the mountain people themselves to embrace the benefits and nuances of market economies, it would be an uphill task to balance conservation and development without marginalising the mountain communities in the process. While advocating market-orientation of mountain agriculture and production systems, particularly with the introduction of high value crops such as *Geranium* and other medicinal and aromatic plants as alternate crops, Budakoti also emphasises the need for institutional reforms, particularly institution building and skill development at the community level. She highlights the necessity for this particularly in the context of marketing mountain crops and goods to ensure fair and reasonable rates of return for the growers. She also suggests the need for skill and awareness building particularly with regard to crop management, and suggests the establishment of Crop Awareness Programmes (CAPs) to build capacity of farmers for yield improvement and germplasm conservation. Dwelling on the issue of crop improvement and germplasm conservation, Pisupati suggests the adoption of the Participatory Plant Breeding Approach (PPBA) for bringing in the correct balance between conservation of traditional knowledge and practices and infusion of modern breeding and crop improvement techniques for enhancing the productivity of local cultivars, landraces, and crop germplasm.

A potential opportunity for South-South cooperation, especially with regard to animal resources and livestock, is suggested by Jose Sanchez Narvaez. Jose, responding to the issue of Himalayan black breed of pigs raised by Oli, remarks that a race of Creole pigs is found in the Andes which, although descendents of the pigs brought by the Spaniards in the sixteenth century, are well adapted to the highlands of Peru. These Creole pigs, Jose explains, are small, black with fallen backs and strong jaws. This particular variety breeds successfully between altitudes of 3,800 to 4,900 masl and have adapted over the centuries to the rigorous climate of the higher altitudes. They forage on available vegetation of the desolate punas, feeding on herbs, wild roots, tubers, insects and other herbivores. Occasionally, they are fed waste from crop

harvests as well as tubers unsuitable for human consumption. Thus, they do not compete for crops required for human consumption, unlike the exotic breeds as pointed out by Oli. The potential for exchanges of such breeds is untapped and as Camino remarks, there are opportunities where South-South cooperation can contribute significantly to the economies and well being of the mountain people of both the regions.

Responding to Tosse and Escobar's description of diversification of opportunities in the 'thermal floors' of Colombia, Sharma and Banskota commend the Colombian example of combining coffee growing with ecotourism. Sharma and Banskota see a tremendous potential for exchange of knowledge and experiences in this regard. Ecotourism, combined with cultural tourism, potentially offers promising opportunities for mountain development and exchanges between the two mountain entities could benefit rural people in both the regions, especially when combined with the promotion of mountain crops and cuisine. Mountain organisations such as ICIMOD could act as a catalytic facilitator for exchange of knowledge and experiences in this sector and thereby add momentum to the process of strengthening South-South cooperation.

Transformation of the process of South-South cooperation into a vibrant reality requires institutional mechanisms at higher levels. Thapa and Sharma outline a framework for encouraging Mountain to Mountain exchanges and strengthening cooperation, particularly with regard to agriculture. The Himalayas and the Andes, they observe, are immeasurably rich in genetic wealth and there are vast opportunities for cooperation which could in turn, substantially improve the livelihoods of mountain farmers. There are certain important factors, Thapa and Sharma opine, necessary for better facilitation of cooperation efforts in agriculture between these two mountain regions. Though not exhaustive, these are immediate



Medicinal plant, Brazil. Photo: R. Faidutti, FAO

imperatives and need to be initiated to facilitate the process:

- The use of improved information and communications technologies to facilitate access to and sharing of information as well as forums to bring together mountain researchers, policy makers, developers and stakeholders. For example, through networks such as Mountain Forum and initiatives such as the “International Workshop on the Andes-Himalayas Cooperation for Conservation and Sustainable Development” organised in Kathmandu in 1999 by the HimalAndes Initiative.
- Creating increased awareness about the global mountain agenda such as through the ‘International Year of Mountains 2002’ declared by the United Nations General Assembly. The same year, a global gathering of mountain women (and men) called ‘Celebrating Mountain Women’ (CMW) was organised by ICIMOD and its partners as a forum for sharing experiences, exchanging knowledge and bringing to light gender issues from different mountain areas of the world.
- International and regional agreements regarding mountain regions. Examples are Agenda 21 launched during the Rio World Summit on Sustainable Development in 1992, where Chapter 13 was dedicated to mountain conservation and sustainable development issues; and COP 7 of the CBD which deals specifically with mountain biodiversity. It is also crucial that the ABS regime of the CBD for crops for recent and new exchanges is carefully crafted for providing fair benefits to mountain communities of the Himalayas and the Andes.
- Research to explore the benefits of sharing and cooperation as a mechanism to improve livelihoods or offer development alternatives. An example is the HimalAndes Initiative, aimed at promoting cooperation between the two regions by identifying potential areas of mutual benefit.

The legal and normative framework for the use of biodiversity and genetic resources and Access and Benefit Sharing (ABS) policies in the Himal-Andes



Cordyceps sinensis (Yarshagumba), Yunnan, China. Photo: Xu Jianchu

Status, key challenges and prospects for institutionalising knowledge and information exchange to strengthen South-South cooperation

It is obvious that the potential and opportunities for fostering a 'knowledge partnership' between the Himalayas and the Andes, founded on the rich knowledge base available in both the regions, lie latent and untapped, awaiting initiatives that will facilitate exchanges and interactions to strengthen a Mountain to Mountain partnership addressing innovations that are economically attractive, socially relevant and environmentally friendly. The comparative approach adopted in the present e-conference and compiled in the preceding chapter, reflects the rich experiences, practices and the resultant wealth of knowledge available among the communities in the two regions. As the account reveals, this knowledge base ranges from individual species, varieties and landraces to a rich diversity of farming systems and, in many instances, extends to the management of natural resources even at the landscape level.

The interactions reaffirm that exchanges between individuals, researchers, communities and agencies have much to offer and that fostering formal frameworks for facilitating such cooperative exchanges can contribute profitably to the larger endeavour for conservation and sustainable use of resources and hence, to sustainable development of the mountain communities in the Himal-Andes. While the e-conference reiterates the growing recognition of the existence of the potential for exchanges, it also re-emphasises the urgent necessity for establishing legal and formative frameworks for facilitating such exchanges as well as the equally urgent need for initiating the establishment of a vibrant, pragmatic and functional Access and Benefit Sharing regime that would strengthen a strong South-South cooperation and thereby,

safeguard and multiply the benefits accruing from the use and exchange of resources and the knowledge base associated with them. This, however, is easier said than done given the intricacies and complexities involved. The following account, therefore, examines the status of the statutory frameworks in individual countries within the two regions and assesses the present state of establishment of Access and Benefit Sharing mechanisms within and between the two mountain entities while simultaneously attempting to identify the issues and concerns that should take centre-stage during the entire formulation process.

The rationale and compulsions for establishing effective legal and normative frameworks and functional Access and Benefit Sharing regimes

The Himalayas and the Andes, as Brendan Tobin and Krishna Oli point out, are both areas of significant importance for biological diversity (see *Background papers*). This importance arises from the extensive ecosystem diversity of the mountainous regions which in turn leads to ecosystem specific and frequently endemic wild and cultivated biological diversity. This diversity is of crucial importance for the maintenance of the ecological balance of these fragile ecosystems, some of which are amongst the world's most challenged biodiversity hotspots. The extreme environments of these two regions are also breeding grounds for potentially valuable extremophiles which have attracted intense interest and attention from science and industry. This interest has grown progressively as both science and industry have realised the tremendous potential and latent opportunities inherent in these resources. It is not surprising then, that countries endowed with such resources are attracting high levels of attention from national and international actors in regard to access to their genetic resources. There is also a simultaneous interest of governments as well as of networks of interest groups, to urgently develop harmonised, fair and effective Access and Benefit Sharing (ABS) regimes in order to ensure protection against unscrupulous exploitation of the resources while

simultaneously assuring accrual of benefits to the custodians of these resources, who in the majority of cases, are indigenous communities.

The Himalayas and the Andes are home to important cultural diversity and the traditional knowledge systems which their cultures have developed. In the Andean countries a significant number of ethno-linguistic groups and other traditional communities exist, including many communities with African roots. Similarly, the Himalayas are home to diverse ethnic communities many of whom have a close, harmonious relationship with the resources endowed within their immediate environments. These different cultural groups and their knowledge systems have developed side by side, and through constant interactions with biological diversity have, in turn, nurtured, conserved, and transformed that diversity.

One of the key challenges for mountain communities has been to devise sustainable farming and gathering practices to ensure long term environmental stability while addressing daily needs and forging development opportunities. Protecting and strengthening the traditional knowledge systems of mountain communities, Tobin and Oli explain, is therefore a key component of any process to protect and conserve biodiversity, as well as promote sustainable use of its components while ensuring equitable benefit sharing. It is equally important, they assert, to ensure that any debate of benefit sharing draws upon the multitude of benefits which may be derived from genetic and biological diversity and does not focus solely on monetary benefits. Indeed the free access to resources upon which many communities depend for their needs is a benefit of greater value, which if lost due to commercialisation, over harvesting or other externally induced reasons, may well mean an actual loss rather than a benefit to the communities.

Dwelling upon this aspect, Sonia Salas, points out that out of the ten global mega-diversity areas, the Andes and Amazonia have contributed approximately 35% of nutritional crop resources and a similar percentage of industrial plant resources to the world at large. Although the benefits have accrued universally and in particular to the rich countries, the returns to the original custodians and centres of origin have been pitifully disproportionate. It is ironic, Salas remarks, that despite the rich diversity of biological resources, the heritage of management of such resources and the wealth of associated knowledge in possession of Andean communities, rural Andean poverty shows no signs of abating. Salas offers an explanation for the situation and states that the dynamics are the result of a polarising economic system, where the resources are undervalued because these resources are used by marginalised people in marginalised situations and hence, are perceived as resources of the poor. While this contributes to undervaluation, an added dimension is when those same resources are introduced in new areas and promoted as exotic commanding premiums, or become the sources of commercial derivatives developed through scientific and technical improvements. While the promoters - be they nations or market forces - profit, the original custodians remain deprived of the benefits, more often than not, because they remain totally ignorant of

the actual value of their resources in the markets and subsequent value additions to their resources because of product derivations. Such exploitation of communities (and of nations) by unscrupulous agencies, the absence of any commitment or compulsions for returning some of the accrued benefits to the original custodians, together with the negligence of governments (particularly in the under-developed, resource rich countries of the South) promote the appropriation of genetic resources and traditional knowledge by Northern countries at the cost of impoverishment, marginalisation and unjust exploitation of the rural poor and encourage the process of overextraction of resources and biopiracy.

Taking this argument forward, Oli, while responding to Pant's example of the introduction of pole beans from India to Rwanda, raises a pertinent point when he questions whether the original holders of the resources have benefited at all from this exchange. Oli acknowledges Pant's assertions on the present inadequacies of the effectiveness of Intellectual Property Rights (IPR) frameworks and agrees that the complexities of IPR regimes have yet to benefit the communities whose knowledge is being exploited. He agrees with Pant and reaffirms the need for making these instruments and procedures more accessible and comprehensible to the people. He emphasises that it is precisely to address such situations that ABS regimes need to be established and made functional.

Until the late seventies, biological resources were perceived as a common heritage of mankind, subject to open access by any party that could harvest and exploit the resources. The principle of open access and exploitation not only resulted in depletion of resources at alarming rates, it also fostered an inequitable sharing of benefits, resulting in unjust exploitation and the perpetuation of neo-colonialism. As awareness and realisation of this unjust and unacceptable access and benefit sharing mechanism increased and communities and nations, particularly those in the developing world, became acutely conscious of the alarming consequences of resource depletion, advocacy for redressal of the existing arrangements and the need for arresting resource exploitation gathered momentum. The growing consciousness and concern, particularly in the three years leading up to the 1992 Earth Summit at Rio de Janeiro, finally culminated in the adoption of the Convention on Biological Diversity (CBD), signed by 156 countries and the European Union at Rio, and subsequently ratified by 188 Parties - 187 countries and the European Union - earning the distinction of being the most widely ratified international agreement.

By ratifying this international, legally binding agreement, governments agreed to accept the responsibility to safeguard and comprehend the profusion of species, genetic materials, habitats and ecosystems. They also agreed to foster development that uses biological resources sustainably. Most important, the Convention recognises the sovereignty of each nation over the biological resources found within its territory and commits nations to find equitable ways to share benefits - monetary as well as non-monetary - accruing out of a nation's biological wealth. Significantly, the Convention in Article 8(j), addresses the issue of traditional knowledge and practices, particularly the conservation, use and applications of such knowledge systems. The Convention sets out three primary objectives and these are conservation of biodiversity, sustainable use of its components, and the fair and equitable sharing



Yaks, Tibet. Photo: Billi Bierling

of benefits derived from use of genetic resources.

The current international regime on Access and Benefit Sharing is complex, diverse and often difficult to comprehend. It consists of a number of international agreements governing various aspects of the use of biodiversity, the centre of which is the Convention on Biological Diversity. While the Convention addresses the conservation of biological diversity and its sustainable use more broadly, the ABS themes are the most innovative aspects of this Convention. As a result, these themes have consistently been the most challenging to implement as well as the most politically charged. Nearly half of all the decisions of Conference of Parties (COP) address the issue of ABS. Finally, regional initiatives within the Andean Community, the African Union, and ASEAN and national efforts by over 50 Parties to the Convention have led to the development of regional and national ABS regimes.

Despite this attention, the issue remains contentious, both within the Convention process and in other fora. This has led to countries calling for a strengthening of international ABS governance in the World Summit on Sustainable Development, the World Intellectual Property Organisation's Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore, the World Trade Organisation's (WTO's) Council for Trade-related Aspects of Intellectual Property Rights (TRIPs) review process and other international fora. This led to the CBD's Multi Year Program of Work (MYPOW) and the ABS Working Group devoting much of their attention to the issue of the need for a new international regime on ABS, which for many countries means a Protocol on ABS.

The status of Access and Benefit Sharing regime formulation in the Himal-Andes

The process of formulating legal and normative instruments as well as an ABS regime at national and regional levels is at a more advanced stage among the Andean community than the Himalayan community of nations. Tobin, in his background paper, provides a detailed account of the initiatives, process and status of ABS regime establishment in the Andean region

(see *Background papers*). Tobin's paper presents an overview of the Andean Community of Nations (CAN) and the status of ABS law and policy at the national and regional level. CAN is formed by Bolivia, Colombia, Ecuador, Peru and Venezuela, and composed of the bodies and institutions of the Andean Integration System (AIS). Its background dates back to 1969, the year in which the Andean Community - then the *Acuerdo de Cartagena* or Andean Pact - was founded.

The countries of the Andean Community of Nations (CAN) possess very high levels of biological diversity. This so-called megadiversity is accompanied by high levels of cultural diversity. A large number of local communities and indigenous peoples inhabiting a wide variety of ecosystems in the region use genetic resources and associated traditional knowledge for different purposes such as food, medicinal, aesthetic and spiritual needs, among others. Historically, the countries of the region and their indigenous peoples and local communities have not profited equitably and fairly from the benefits derived from technological innovations and commercial applications of genetic resources and traditional knowledge, predominantly conducted by Northern countries and their agencies.

CAN Member Countries were among the first to recognise the value of their biological and genetic resources and to adopt measures to protect them, with instruments such as a regional ABS regime, a Regional Biodiversity Strategy and the adoption of Decision 486 which establishes a regional intellectual property rights (IPR) regime requiring disclosure of the right to use genetic resources and knowledge of the region as a requirement for the granting of any Intellectual Property Rights (IPR). CAN member countries are also working on the development of a common regime for the protection of traditional knowledge in close collaboration with indigenous peoples of the region.

Debate in the region on the importance of megadiversity (including cultural diversity) and of associated traditional knowledge began in earnest in the early 1990s and led to recognition of the need to develop a regional ABS framework. Adoption of a regional ABS regime in 1996 led to concerted action at the national level to take action to ensure that the challenges of ABS implementation under both the CBD and relevant provisions adopted by CAN, are understood by all agencies and other actors engaged in preparing policies and activities that involve or have an impact on biodiversity, genetic resources or traditional knowledge. These include government and other agencies responsible for agriculture, fisheries, forestry, public health and those agencies responsible for development of legal frameworks addressing biotechnology and intellectual property rights regimes.

All CAN Member Countries have submitted CBD national reports stressing the scientific, economic and cultural possibilities for national development through their genetic resources. They have also highlighted their commitments to implement mechanisms which ensure access and distribution of benefits in accordance with the CBD. They also refer to the need of additional actions to effectively implement ABS national frameworks, including the participation of interested parties and the development of joint capacities. The CAN was the first regional economic grouping of

National ABS law and policy in the Andean community of nations

All countries of the region are parties to CBD and have prepared National Biodiversity Strategies and Action Plans, (NBSAPS). The following section outlines briefly the main ABS related measures adopted by each country.

Bolivia

The Constitution of Bolivia has as one of its objectives the protection and conservation of the environment and natural resources. Bolivia ratified CBD, in July 25, 1994. It has implemented Decision 391 through national measures on access developed through a comprehensive national participatory process, held between September 1996 and May 1997. The regulation covers genetic resources for which Bolivia is the country of origin, their by-products, their intangible associated components and genetic resources of migratory species that for natural reasons are found in national territory. To date, of the reportedly 9 applications for access to genetic resources received by the Vice-Minister of Natural Resources and the Environment, as the National Competent Authority, only one has been approved.

In 1998, a process began to develop national measures for protection of traditional knowledge. Once again this involved an ambitious participatory process involving mainly indigenous peoples and communities from the highlands (West) and lowlands (East). Work is still ongoing on the so-called Norma de Protección de los Conocimientos Tradicionales, (Traditional Knowledge Protection Law), it is to be imagined that under the new national leadership this issue will receive even greater emphasis.

Colombia

In Colombia the Ministerio del Medio Ambiente Vivienda y Desarrollo Territorial (Ministry of the Environment) is the National Competent Authority for ABS issues. The Ministry has responsibility for regulating compliance with Decision 391, as well as for receiving, processing ABS applications and negotiating and monitoring compliance with ABS agreements. Since entry into force of Decision 391, almost sixty applications to access genetic resources have been made, mainly for research purposes. Processing applications has however proved problematic due to conflicts over competence to grant approvals and the lack of necessary administrative and legal procedures. Following creation of the Ministry of the Environment by the last Government, it was decided to establish new procedures for processing ABS applications. Work is ongoing on a resolution to this end which it is hoped will enter into force before the end of the year. Significant work has been carried out by Colombian non-governmental and indigenous organisations to promote national dialogue on ABS law and policy and protection of traditional knowledge. Progress in this area, where Colombian organisations for a long time lead the way has been one of the victims of the prolonged hostilities in that country.

Ecuador

Work has been going on in Ecuador since 1998 on development of national law and policy on ABS, under the guidance of the Grupo

Nacional de Trabajo sobre Biodiversidad (National Biodiversity Working Group) (GNTB). In November 1999 the Sub-Working Group of Genetic Resources of the GNTB 1999 supported by the World Conservation Union's Regional Office for South America (IUCN-SUR), Fundación Ecuatoriana de Estudios Ecológicos (ECOCIENCIA), and the Centro Ecuatoriano de Derecho Ambiental, prepared a first draft legislative proposal. This document was officially submitted to the Ministry of the Environment and became the basis for a broad participatory process. This consultation lasted three years and the Ministry of the Environment is currently reviewing the results with a view to adoption of measures by way of Presidential Decree before the end of the year. The Fundación Ecuatoriana de Estudios Ecológicos (ECOCIENCIA) with the collaboration of the Ministry of the Environment and in cooperation with the Instituto Nacional Autónomo de Investigaciones Agropecuarias (INIAP), have published a guide on access to genetic resources in Ecuador. This guide has been validated in workshops with the participation of various sectors of the country related to the subject, such as research centres, seed companies, pharmaceutical industry, universities and sectors of indigenous people, local communities, peasants and environmental organisations, among others. The guide offers a practical and critical assessment of Decision 391, for all sectors including decision makers.

The National Environmental Authority is working to build and strengthen national capacity to control ABS through the development of subregional information networks, as well as the establishment of monitoring and vigilance systems to prevent biopiracy. Although to date Ecuador has not entered into any ABS agreements, there is increasing interest and pressure from national and international institutions to do so.

Peru

Peru has developed an extensive normative framework related to access to biological diversity, distribution of benefits and protection of traditional knowledge which includes:

- Registro de Acceso a Recursos Genéticos (ABS Register), Resolución Jefatural No. 090-2005-INRENA published on July 15th 2005.
- Ley que establece el Régimen de Protección de los Conocimientos Colectivos de los Pueblos Indígenas vinculados a los Recursos Biológicos (Law for the Protection of Traditional Knowledge). Law No. 27811, published on August 10th 2002.
- Ley de Protección al Acceso a la Biodiversidad y el Conocimiento Tradicional in Perú (also named Biopiracy Prevention Law, Law No. 28262.)

As the other countries of the region Peru has been working for many years on the development of national ABS law and policy. A wide participatory process has generated and improved awareness regarding the sustainable use and conservation of the country's genetic resources, triggering a series of initiatives at the local level. A regulatory proposal is presently at the Office of the Presidency of the Republic, ready to be signed. Under this proposal, CONAM (National Council for the Environment) would assume responsibility for coordinating issues relating to

ABS amongst different sectors, as well as for approving national policies on conservation and proper use of the country's genetic resources. INRENA (National Institute for Natural Resources), INIEA (National Institute for Agricultural Research) and the Vice Ministerio de Pesquería (Vice Ministry of Fisheries) would each have sectoral competence for approving ABS agreements. All of these have developed draft Material Transfer Agreements on ABS. Peru has consistently proposed that principles and proposals such as disclosure of origin and certificates of origin now under discussion in the CBD, WIPO and others, should be part of regional and national negotiation agendas. Peru will host the first meeting of the Group of Technical Experts on Certificates of Origin, established by COP 8, in the second half of 2006. During negotiation of a Free Trade Agreement (FTA) between Peru and the US, Peru consistently pushed for recognition of its sovereign rights over biodiversity and the rights of indigenous people and local communities over their traditional knowledge. This was the first time any FTA had included such issues, however, upon signing of the agreement these provisions had been significantly watered down. In a recent national debate on the FTA and biodiversity hosted by CONAM, participants concluded that the state should continue to argue for full and effective protection of these rights under any FTA.

Venezuela

Although Venezuela has recently pulled out of the CAN, it had previously taken significant steps towards implementation of Decision 391. This included appointing the Ministerio del Ambiente y de Recursos Naturales (Ministry of the Environment and Natural Resources or MARN) as the National Competent Authority. In 1997 the Comisión de Acceso a los Recursos Genéticos (Commission on Access to Genetic Resources) was created with a mandate to provide advice on matters regarding access to genetic resources to the competent National Authority. Since 2003 the Oficina Administrativa de Permisiones (Licences Office) of the MARN has held responsibility for processing and negotiating all ABS applications, with the Commissions advice. Since 1996, MARN has received thirty-nine applications on access to genetic resources. Many of these were not processed due to failure to provide relevant documentation etc. However, since 2003, Venezuela has entered into six framework contracts with various institutions. These contracts, as provided for in Article 36 of Decision 391, seek to minimise bureaucracy relating to non commercial research projects. No bioprospecting contracts have been signed with companies producing pharmaceuticals or other commercial products. To date there has been little experience with contracts relating to traditional knowledge.

(Source: Tobin's background paper, see *Background papers*)

countries to adopt a regional regime on ABS. Decision 391, adopted in July 1996, established a Common Regime on Access to Genetic Resources. This Decision developed specific principles and norms on how and under what conditions access to and use of components of biological and genetic heritage of the subregion can be possible. CAN also established the Andean Committee on Genetic Resources. The committee first met in 2000 to present an overview of implementation of Decision 391. Besides Decision 391, the Andean Community has adopted two significant regional Decisions on Plant Breeders Rights and Intellectual Property Rights which are of much importance for regulation of rights over genetic resources and traditional knowledge. These are Decisions 345 and 486 respectively.

Decision 345 of the CAN establishes a Common Regime on Plant Varieties Breeders Rights which allows for the granting of Breeders Certificates which provide for exclusive rights over the variety. Article 24 of the Decision entitles the holder of a certificate to exclude third parties from certain activities related to the reproduction, propagation or multiplication of the protected variety, including the production, offer on sale, sale, exportation and importation.¹ The regime allows for a researchers exemption and a farmer's exemption, subject to national legislation.

By Decision 486, adopted in 2000, the Andean Community established a Common Industrial Property Regime with some very interesting provisions regarding ABS and traditional knowledge. Article 3 sets out from the beginning the intention to ensure that the granting of intellectual property rights shall be conducted in a manner which safeguards the heritage of the regions, of indigenous, local and Afro-American communities.² Article 26 establishes what may be seen as the first comprehensive system requiring the disclosure of the legal provenance of genetic resources and/or traditional knowledge as a precondition for the granting of any property rights. The result is the establishment of the first regional disclosure of origin system. Disclosure of origin has been championed by the countries of the Andean community at the international level as a means to make IPR regimes support the CBD's ABS provisions.³ Article 26 also provides a basis for relevant patent authorities to nullify patents in the event that the information required is insufficient or incorrect.

In July 2002 Andean countries adopted Decision 523, "The Regional Biodiversity Strategy for the Tropical Andean Countries". The Strategy identified ABS and associated traditional knowledge as key elements amongst its objectives. Some priority actions relevant to the Regional Biodiversity Strategy are: the promotion of policies, strategies and action programs for the management of genetic resources (Objective 1.8); development of a better understanding of the concepts, principles and criteria regarding the distribution

¹ See Ruiz, Manuel, The Andean community's New Industrial Property Regime: Creating synergies between CBD and Intellectual Property Rights, in *Bridges Nov/ Dec 2000*. Available at <http://www.iprsonline.org/ictsd/docs/RuizBridgesYear4N9NovDec2000.pdf>

² *ibid.*

³ For more on disclosure of origin see Barber, Charles, Sam Johnston and Brendan Tobin, UNU-IAS Report - Options for Developing Measures in User Countries to Implement the Access and Benefit Sharing Provisions of the Convention on Biological Diversity, 2nd Edition available at http://www.ias.unu.edu/binaries/UNUIAS_UserMeasures_2ndEd.pdf, Sarnoff, Joshua and Carlos Correa, Analysis of Options for Implementing Disclosure Requirements in Intellectual Property Applications, UNCTAD 2006 available at http://www.unctad.org/en/docs/ditcted200514_en.pdf, WIPO Technical Study on disclosure requirements related to genetic resources and traditional knowledge. Available at http://www.wipo.int/documents/en/document/govbody/wo_gb_ga/pdf/wo_ga_30_7.pdf, Chouchena-Rojas, Martha, Manuel Ruiz-Muller, David Vivas, and Sebastian Winkler (November 2005) Disclosure requirements: Ensuring mutual supportiveness between WTO TRIPS Agreement and the CBD, IUCN Gland and Cambridge and ICTSD Geneva. Available at http://www.iucn.org/en/news/archive/2005/12/disclosure_requirements_publication.pdf

of benefits (Objective 2.10); establishment of common policies for strengthening and protecting traditional knowledge and practices relevant to biodiversity, with the participation of indigenous, Afro-American and local communities (Objective 3.11); and increasing capacities of indigenous, Afro-American and local communities to strengthen and protect traditional knowledge and practices relevant to biodiversity (Objective 3.12).

The Andean Committee on Genetic Resources in its subsequent meetings (August 2004 and March 2005) recognised the need to seek support for capacity building in the region in order to assist with the implementation of Decision 391. The CAN Council of Ministers of the Environment and Sustainable Development which met in Caracas, in April 2005, decided to prioritise the development of a project to strengthen Andean capacities for the application of the Andean Common Regime on Genetic Resources, on the basis of priorities identified by Member Countries. A project for ABS capacity building was submitted to the Global Environmental Facility (GEF) by the CAN Secretariat in April 2006.

The case of ABS and protection of traditional knowledge has also been taken up in other regional forums incorporating Andean countries including the Forum of Ministers of the Environment of Latin America and the Caribbean and the Organización del Tratado de Cooperación Amazónica (Amazon Cooperation Treaty Organization). The Forum meeting in November 2003 in Panama highlighted ABS issues in the Regional Action Plan 2004-2005 to implement the Latin American and Caribbean Initiative for Sustainable Development (ILAC), which was adopted in 2002. The Forum also agreed to support the organisation of specialised meetings to exchange experiences and strengthen institutional capacities of the countries on ABS and facilitate participation of indigenous peoples and local communities in the design of ABS regimes. The Organización del Tratado de Cooperación Amazónica in its strategic plan for 2004-2010 identified as a priority, issues on biodiversity, biotechnology and bio-commerce and addressed the need to establish relevant mechanisms to harness Amazonian biodiversity knowledge.

CAN member countries have also taken steps towards the development of a Regional Law on Protection of Traditional Knowledge. Decisions 345, 391 and 486 all recognise that indigenous, local and Afro-American communities have rights over their traditional knowledge, subject to national law and policy. The result has been to extend the precepts of the convention on biological diversity on prior informed consent to traditional knowledge. It is now a requirement that in order to obtain IPR over a product developed utilising traditional knowledge the applicant must show that prior informed consent for use of that knowledge has been obtained from the relevant community. This measure is however limited in its scope as it does not prevent misappropriation and use of traditional knowledge outside the community's jurisdiction and only relates to uses leading to application for IPR. CAN is now working on the development of a proposal for a *sui generis*



Seabuckthorn, Upper Chitral, Pakistan. Photo: Ujol Sherchan

regime for the Andean countries. An initial draft was prepared by a group of indigenous experts in 2005 and published in book form as "Elements for *sui generis* protection of the collective and integral traditional knowledge from an indigenous perspective".⁴ In addition to the regional initiatives and detailed measures outlined, each member state, being a party to CBD, has prepared their respective National Biodiversity Strategies and Action Plans (NBSAP), an account of which is provided by Tobin in his background paper and highlighted in Box 3.1.

Progress in the Himalayan region, in contrast, lags significantly behind the Andean region, and although most of the countries have set the process of formulation of statutory instruments in place, the progress is by no means uniform. As Oli points out in his background paper (see *Background papers*), although most countries in the region have their action plans and statutory instruments in place, a few are yet to complete the process of formulating even their ABS framework. Summarising the progress, Oli reports that China established its National Biodiversity Unit (NBU) in 1993 headed by the National Environment Protection Agency. It has adopted a ten point strategy from 1992 and the Biodiversity Conservation Action Plan has been prepared and adopted since 1997. The access and benefit sharing arrangements are enforced through Wildlife Protection Law 1989 and Wild Plant Protection Regulations 1997, Seed Management Regulation (crop seeds 1991, tree seeds 1995) and Regulation of Breeds of Stocks and Poultry Management 1994. The process of making an umbrella ABS legislation is evolving as stipulated in Biodiversity Country Report 1997.

The issue in India has seen a prolonged debate and consultation, which has over the years, resulted in the formulation and promulgation of the Protection of Plant Varieties and Farmers' Rights Act, 2001. The Rules for this Act were formulated in 2003. The country has also formulated and promulgated the Biological Diversity Act in 2002 (enacted on December 2002 and received the assent of President of India on February 2003) and Biological Diversity Rules in 2004 (enforced in April 2004). The implementation of the Act is coordinated by three functional bodies, the National Biodiversity Authority (NBA), the State Biodiversity Boards (SBB)

⁴ De la Cruz, Rodrigo, et al. *Elementos para la protección sui géneris de los conocimientos tradicionales colectivos e integrales desde la perspectiva indígena*, CAN 2005



Ocas, Bolivia. Photo: CONDESAN

and the Biodiversity Management Committees (BMC). Pakistan adopted the Biodiversity Action Plan in 1999 with a view to promote conservation and sustainable use of biodiversity and equitable sharing of benefits arising there from. It has also recommended promulgating ABS regime in Pakistan and a draft ABS law has been prepared. Bhutan has already completed the Biodiversity Action Plan and set in place the Biodiversity Act 2003. Similarly, Nepal has formulated the country's Biodiversity Strategy 2002 and is in the process of finalising the Action Plan. The country's ABS law has been drafted. In Bangladesh, although the Biodiversity and Community Knowledge Protection Act 1998 has been drafted, it is still awaiting promulgation. Myanmar has its National Environment Policy of 1994. The Forest Act 1992 and Wildlife Act 1994 are the legal instruments developed in response to the implementation of CBD to address the management of the biodiversity resources within the country. Thus, apart from India and Bhutan, all the countries in the Himalayan region are still developing legal instruments. Despite the importance of the subject and the progressive emphasis given to access and benefit sharing in consecutive COP meetings, the Himalayan countries, unlike their Andean counterparts, have not shown a uniform progress. More importantly, unlike the Andean countries, the Himalayan countries have failed to take initiatives for the establishment of a regional forum for putting a functional regional ABS regime in place.

Critical concerns in reconciling the need to protect against unscrupulous exploitation and enhance benefits that can accrue from access to genetic resources and traditional knowledge to the true custodians

In the absence of a clear international regime, the responsibility for ensuring equitable benefit sharing has, to date, fallen primarily on the shoulders of developing countries which have been working to develop law and policy to regulate access to genetic resources and benefit sharing. However, with the

adoption of the Bonn Guidelines on ABS, there has been growing acceptance of the responsibility of so-called user countries to take complementary measures to ensure that the CBD's ABS objectives are realised. More recently, negotiations have begun under the auspices of the CBD's Ad-Hoc Working Group on ABS to negotiate an international regime on ABS. As negotiations proceed many countries continue to develop their own national measures to protect their genetic wealth and associated traditional knowledge from misappropriation and to ensure fair and equitable benefit sharing. At the international level, COP negotiations have also kept the issue of access and benefit sharing centre stage, emphasising the importance of establishment of frameworks to address benefit sharing in successive meetings, starting from COP-2, and in the last meeting, COP-8, even organised a side event specifically addressing the issue with special focus on mountains.

The formulation of an effective, functional ABS regime is complex, given the multiplicity of stakeholders as well as the equally wide range of stakeholder interests and concerns that require addressing and incorporation. This complexity is increased by the conflicting interests and perceptions as well as the dilemma of protection against appropriation and the need to enhance benefits arising out of the biological resources, traditional knowledge and practices that can be potentially put to use. Tobin, in his background paper, lucidly elucidates and deals on the complexities involved and highlights the concerns and challenges inherent in the process.

One of the key elements of the national processes for development of law and policy in this area, he highlights, has been the need to establish timely, meaningful, informed and local participatory processes. This challenge has been particularly acute with regard to the development of processes for securing participation of indigenous peoples and local communities in debates on mechanisms for protection of traditional knowledge.⁵ Participation of indigenous peoples and local communities in the debate on measures to regulate ABS and protect traditional knowledge is key to establishing functional legal regimes. Most importantly, there is a need to move beyond the limited objective of preventing the misappropriation of traditional knowledge and towards the strengthening of indigenous peoples and local communities' knowledge and innovation systems through which they have over the centuries maintained, nurtured and developed knowledge to respond to their subsistence and development needs and to meet new challenges and opportunities.

Tobin points out that for many, the debate on protection of traditional knowledge immediately brings up visions of biopiracy and abuse of cultural property, and with it, a debate on how to prevent future misappropriation. This debate, while valuable in itself, may sometimes fail to focus on the broader range of threats to traditional knowledge systems which arise through inappropriate educational, health, agriculture, and fisheries development policies, as well as through the influence of organised religion. While there is undoubtedly the need to focus on the importance of protection of traditional knowledge it is equally important to move

⁵ See Tobin and Swiderska: Speaking in Tongues: Indigenous participation in the development of a Sui Generis regime to Protect traditional knowledge in Peru. Available at <http://www.iied.org/pubs/pdf/full/9059IIED.pdf>. Spanish version En busca de una lengua común: Participación indígena en el desarrollo de un régimen de protección sui generis para la protección del conocimiento tradicional en Perú. Available at <http://www.iied.org/pubs/pdf/full/9176IIED.pdf>.

the debate forward from prevention of abuse by some unknown third party to revision of detrimental national laws and policy. This implies, in turn, the need for a redefinition of values and a focus away from a paradigm of purely protection against misappropriation and more towards one of strengthening of Traditional Knowledge (TK) innovation systems. What is at stake is not merely rights over TK but the very basis of international development law and policy making and the philosophy which will direct sustainable development programmes of the future. Therefore, far from being merely a debate on the distribution of benefits based upon identification of property rights, what is being addressed is both the nature of property rights and of benefits, and beyond that, of the threats to traditional knowledge.

Tobin observes that the issue of local community interests permeates the present debate, as does the idea of promoting South-South knowledge exchanges. This, he observes, reflects the growing international concern to recognise indigenous knowledge systems and rights over them and to promote their wider use for environmental and developmental goals. The clear conclusion is that if there is to be development of any ABS law and policy, it must be framed within a process designed to ensure the rights and interests of local communities and indigenous peoples over their traditional knowledge. This is clearly a measure of the present level of relative strength which indigenous peoples and local communities enjoy in the current international debate on these issues. This strength, Tobin opines, has been obtained in part due to the perceived benefit to developing countries of championing TK rights over international intellectual property rights law and policy. The question is how long will that interest last and how long can indigenous peoples and local communities wait before providing clear guidance to governments on what they believe to be the most appropriate manner to protect their interests.

Continuing on the issue of traditional knowledge, Tobin raises another dimension - that of the focus of science and research and development activities relating to the use of biological and genetic diversity. ABS debates almost invariably tend to focus on issues of controlling access, distributing benefits and regulating rights over TK. What is rarely, if ever, discussed is whether ABS has a role to play in defining the focus of research. While there is often discussion of how to secure benefit sharing through building of national technical and commercial capacity, there is hardly any discussion ever, of how to ensure that whoever does the research will focus on the interests of the custodians of knowledge and resources - indigenous peoples and local communities of the mountainous regions.

Reflecting the concerns highlighted by Tobin, particularly with regard to the ethical issues involved, Ashish Kothari points out that given the critique of Indigenous Peoples of the present Access and Benefit Sharing Regimes, it is critical that the exercise and process acknowledge the ownership and custody of resources as well as the traditional knowledge base in the broader context of ownership and custody, cultures, territorial and other rights. The issue of access and benefit sharing,

he points out, will always be driven by inequities and unfairness unless the larger context is established first. Additionally, many fundamentally challenge the very concept and notion of intellectual property rights on life forms or on any forms for that matter and hence, for the ABS regimes to be universally acceptable, these larger concerns and issues impinging on politics and social dynamics of knowledge need to be addressed as critical prerequisites.

Kothari's concerns finds echoes in Camino's remarks when the latter questions the issue of ownership claims to biological resources. The modern concept of ownership, Camino remarks, is a natural development of market capitalism. In certain ways, this perhaps, is the crux of the issue and the reason for establishing the ABS regime is to ensure that community 'ownership' of resources and knowledge governed by customary laws is not distorted and replaced by national and international statutory instruments that contradict and conflict with traditional norms, thereby depriving the very custodians of knowledge and resources from enjoying the benefits accruing from the resources that are rightfully theirs. Reflecting on the essence of Camino's concerns, Tobin observes that the e-conference though brief, has been illuminating in the sense of highlighting the fact that the focus on law and policy development is to some extent divorced from the sense of reality of community needs and realities. Bridging this gap and resolving their conflicting concerns is perhaps the biggest challenge faced in the course of formulating an ABS regime that addresses concerns raised by the various stakeholders.

In this context, it is important to highlight initiatives being undertaken by indigenous peoples themselves and local communities to defend their rights and to develop their own programmes to protect their interests. These include numerous projects for the development of community registers of TK and also in-situ conservation programmes such as that of the Potato Park in Peru which has brought together a group of communities to work to protect their bio-cultural integrity. This protection has progressed from development of seed saving programs to development and marketing of medicinal products, and finally matured to negotiation of an agreement for repatriation of genetic resources from the International Potato Center. The novelty of this initiative lies in the fact that the agreement arrived at has largely been based upon principles of customary laws of the indigenous peoples themselves. Programmes such as these may be the way forward for securing appropriate protection of rights without losing the cultural context under which those rights have been framed.

Key challenges in establishing a just and effective Access and Benefit Sharing regime

Although the task of formulating and establishing a fully functional Access and Benefit Sharing Regime is daunting, given the complexity of issues and the expectations of multiple stakeholders, Brendan Tobin presents a road map to identify key challenges for the development of ABS laws and policies in his background paper. Tobin observes that based upon the experiences of the Andean countries which have been working for over eight years to develop functional national and regional regimes on ABS, a number of key factors can be identified that must be addressed in order to secure effective ABS governance. These, he observes, may be categorised in three



Mountain forest, Bhutan. Photo: Elisabeth Kerkhoff

broad areas: compliance, comprehensiveness and capacity building.

The first of these relates to the ability of national authorities to establish mechanisms for ABS governance which can ensure effective compliance by users with ABS requirements. This requires action by countries both as providers and users of resources if an effective international regime is to be established. Two key issues relating to compliance, prior informed consent (PIC) and tracing and monitoring of resource flows, use and benefit sharing through a certificate of origin/source/legal provenance system need to be addressed. Secondly, there is a need, he opines, for a comprehensive approach to ensure that regulation of ABS is developed in a manner which respects and reflects the rights of local communities and indigenous peoples and is complemented by development of mechanisms to protect traditional knowledge rights. Two key considerations in this area are the role of customary law and practice of indigenous peoples and local communities, and the use of databases and registers for collating traditional knowledge. The third area, Tobin points out, is the recognised need for capacity building at all levels as a prerequisite for development, adoption, implementation, and enforcement of law and policy, ABS regime, and current measures. The following section expands on these aspects, highlighting the nuances and thereby, tries to bring out the subtle intricacies involved, ignoring which would render an ABS regime ineffective.

Compliance

Elaborating on the complexities of the ABS regime and specifically discussing the process mechanisms, Tobin suggests that providing opportunities for indigenous peoples and local communities to participate in the development of law and policy as well as its implementation is crucial. This is important not only with regard to the development of *sui generis* regimes for the protection of traditional knowledge, but also to design and implementation of ABS regimes. Unfortunately, securing such participation is often restricted, amongst other things, due to lack of funding, a sense of immediacy with regard to the need to develop regimes to prevent biopiracy, and the lack of

functional mechanisms for consulting isolated communities. There is also, frequently, a sense that communities have little, if anything, to offer to what are perceived as technical challenges to develop law and policy. As a result, even where law and policy is developed with the best of intentions, the resultant outcome, he observes, may not successfully represent the interests, priorities and rights of the very communities it was intended to benefit. In fact, if this is not dealt with with great care, the result can be the development of law and policy which undermines local communities and indigenous peoples' rights over their knowledge and associated biological resources, thereby fomenting discord amongst communities, and promoting exploitation of resources and knowledge, contrary to the desires of their custodians.

It is crucial, therefore, that communities be given an opportunity to become aware of all of their rights and of how they are being protected, and be empowered to influence the processes of decision making which defines and enforces such rights. Many local communities and indigenous peoples have their own customary laws, which regulate access to knowledge and resources, control its use, and define how benefits should be shared. These customary regimes are sometimes respected and recognised by national law and where this is the case, these *sui generis* regimes can play an important role in defining rights over resources and knowledge. Customary law regimes, even where not formally recognised, can help national decision makers to design appropriate mechanisms for protection of traditional knowledge.

In approaching indigenous peoples and local communities to discuss such matters, Tobin cautions that it is rarely beneficial to commence dialogue focusing on an existing law or policy. The language, context, and focus of any document will probably seem foreign and may lead to confusion and concern which undermine a meaningful debate. A more effective approach, he suggests, may be to organise any encounter in such a way as to provide participants with the opportunity to discuss:

1. Their own local reality, the importance of biological resources and traditional knowledge for their local economies, social, cultural and spiritual well-being. During such discussion information on the scientific and commercial interest may usefully be presented.
2. The manner in which they maintain their knowledge and resources and the conditions under which they provide access to third parties, as well as the conditions of access, controls over use and benefit sharing arrangements (if any).
3. Real and perceived threats to their resources and knowledge.
4. Actions they can take themselves to protect their knowledge and resources.
5. Support they need from government, academia, NGOs and others to protect their knowledge and resources.
6. Consideration of measures taken, or proposed by government to regulate access to genetic resources and benefit sharing as well as for protection of traditional knowledge.

If any dialogue or consultation is approached in this manner, it will more likely produce a meaningful result than if communities are provided with information on any existing national law and asked whether they think it is adequate. It is also better to get communities to identify a broad range of threats to traditional knowledge and biological diversity which exist, including those from inappropriate national development policies on education, health, agriculture and fisheries extension programmes, etc. as well the impacts of organised religion and other external non-governmental actors. This will provide a more balanced picture of where the real threats lie and, therefore, what is required of national law and policy to have any significant impact on processes of resource and knowledge erosion. Where the issue of biopiracy is made the focus of the debate from the outset, the result may be to promote an unrealistic picture of the dangers to traditional knowledge systems and also to leave the impression that indigenous peoples and local communities must await action by governments and the international community to protect their knowledge and innovation systems.

In fact there is much that communities can do to protect and conserve their knowledge including passing it on to future generations and adopting innovative strategies for knowledge management, including through the use of databases and registers. However, there has been a worrisome trend towards seeing in databases and registers some form of panacea to the existing problems of biopiracy. The development of any form of database or register of traditional knowledge is a matter which must be approached with caution. In the first place it will be important to determine a number of key issues, including:

- Who will hold the database/register and control access to it?
- The objective of the database or register - to protect information for future generations, provide a source of information for community members, act as evidence of prior art for patent applications, etc.
- Scope of information to be held - all traditional knowledge, only publicly available knowledge, confidential knowledge, spiritual knowledge, etc.
- Rights and modalities of access - Open, restricted, exclusive.
- Costs for maintenance.
- Conditions for access - free, fee based.
- Who defines policy? Who defines benefit sharing?

As Tobin observes, these are only a small number of the complex issues which need to be addressed prior to establishing a register or database. Consideration of past experiences in this area would be useful, and contact with relevant groups such as those responsible for the design and maintenance of databases for protection of traditional knowledge such as the Tualip Tribes (USA), Vanuatu Cultural Center (Vanuatu), Potato Park (Peru), Honey Bee (India) and others is advisable. Tobin suggests the

use of the report prepared by the UNU (<http://www.ias.unu.edu>) for a policy report on TK Registers and Databases prepared by the United Nations University, Institute of Advanced Studies.

Addressing the issue of compliance, Tobin explains that with the possible involvement of a multiplicity of stakeholders in a wide variety of potential permutations the context of bioprospecting and product development through biotechnological means, there is a need for developing ABS governance systems which can monitor the use of resources from collection through to development and the final marketing. Two key mechanisms are envisaged in this regard, the instrument of Prior Informed Consent (PIC) and an internationally harmonised system for tracing genetic resource and traditional knowledge flows through a form of certification of origin/source/legal provenance.

Prior informed consent

The CBD did not elaborate criteria for PIC: these had to await adoption of Bonn Guidelines in 2002. The Bonn Guidelines provided guidance for practical measures that both countries and stakeholders may take to secure the CBD's ABS objectives. Section VI of the Guidelines sets out the basic principles and elements for a PIC system including appointment of a competent authority, timing and deadlines, identification of use, consultation of stakeholders, obtaining of PIC, and issuing permits or licenses. The CBD, as drafted, limited the requirement for PIC to countries providing resources. However, Article 8(j) did establish an obligation for countries to seek the consent of indigenous peoples and local communities when promoting the wider use of their knowledge. Over time it became accepted that in order to protect the rights of indigenous peoples and local communities over their knowledge it would be necessary to ensure that PIC be obtained from them. The Conference of the Parties at its fifth meeting extended the requirement to obtain prior informed consent to include traditional knowledge. It states that "*Access to traditional knowledge, innovations and practices of indigenous people and local communities should be subject to prior informed consent or prior informed approval from the holders of such knowledge, innovations and practices*".⁶ In the Andean Community, regional legislation has made granting of patents dependent upon evidence of PIC for use of traditional knowledge. In August 2002 Peru established the first comprehensive *sui generis* regime for the protection of rights over traditional knowledge through the Law 27811.⁷

The basic principles for a system of PIC as set out in the Guidelines include:⁸

- Legal certainty and clarity
- Access to genetic resources should be facilitated at minimum cost
- Restrictions on access to genetic resources should be transparent, and not run counter to the objectives of the CBD

⁶ UNEP/CBD/COP/5/23, Decision V/16/5.

⁷ See Sophia Hirakuri and Brendan Tobin, *Prior Informed Consent and Access to Genetic Resources and Benefit Sharing: Paralysis or Prudence*, In *Work in Progress* Volume 17, No. 2 United Nations University, Summer 2005, available at <http://update.unu.edu/downloads/38workinprogress.pdf>.

⁸ *ibid.*

- PIC from the government of the provider country and any relevant stakeholders such as indigenous peoples and local communities according to the circumstances and applicable domestic laws.

At first glance, it may appear that adoption and implementation of PIC processes should be straightforward. In reality, developing functional PIC procedures has proven to be the most complex of all issues relating to regulation of ABS. Experience in the development of national ABS law and policy in the Andean community and its member countries has shown that it is vital to secure the full and informed participation of all stakeholders and in particular of indigenous peoples and local communities at the earliest possible stage in the process of development of PIC procedures. It has also shown the importance of developing *sui generis* law and policy on protection of traditional knowledge in tandem with the development of ABS law and policy. Although a comprehensive discussion on the development of traditional knowledge law and policy merits a detailed deliberation, considering that it is one of the key components of ABS Governance, customary law needs special and focused attention and addressing.

Certificates of origin

One of the key elements of any national, regional or international regime which presumes to ensure fair and equitable benefit sharing must include some means of identifying where resources come from, where they are used, where benefits have been obtained, and how to remit benefits to the entitled parties. This, in turn, demonstrates the need for some mechanism to identify resources, trace their flows, monitor their use and enforce, where necessary, rights and obligations pertaining to benefit sharing.

One proposal advanced has been for the development of an international certificate of origin system for this purpose. The idea behind such a system would be to require users of genetic resources and/or traditional knowledge to demonstrate evidence of their rights to use these resources at key checkpoints, as for example at the time of application for a patent (disclosure of origin) or for product approval, etc. This idea has received significant international support and proposals for certification are now widely discussed. Work to consider the format (i.e. should it focus on origin, source or legal provenance?), nature (binding or voluntary) as well as the practicality, feasibility and cost is now shifting to an international group of technical experts established by the CBD which will meet in December 2006 in Peru to consider such issues. In order to provide stakeholders with an opportunity to provide input to the official process, UNU-IAS will host a three-day stakeholders meeting on certificates of origin also in Peru immediately prior to the technical groups meeting.⁹

Developing any system for tracking of resources will imply significant effort for national authorities and for those wishing

to ensure their interests are being protected. This implies the need for establishment of national and community registers and monitoring and tracking procedures. Efforts in this vein are already underway in a number of Andean countries and development of local community registers is happening both with government support and at the initiative of local communities themselves.

One of the most interesting experiences in this area involves a group of local communities outside Pisac in the Peruvian Andes where working together with Asociacion ANDES communities have developed their own systems for recording and registering their knowledge. The experience of the potato park includes not only the conservation of landraces but also an agreement for repatriation with the International Potato Center as well as an agreement amongst communities for benefit sharing both of which are grounded in customary law.

Comprehensiveness

While discussing the theme of comprehensiveness, Tobin elaborates on the two elements he regards as essential in the development of ABS regimes under this particular theme - the role of customary laws and traditional knowledge governance, and traditional knowledge databases and registers.

The role of customary laws in ABS and traditional knowledge governance

Development of national and international law and policy on ABS is inextricably linked to the development of appropriate law and policy to recognise and protect the rights of indigenous peoples and local communities over their traditional knowledge. There is a growing tendency to require prior informed consent of indigenous peoples and local communities for access to genetic resources on their land as well as to traditional knowledge. It is also increasingly recognised that customary law and practice of indigenous peoples and local communities has a key role to play in defining the manner in which PIC procedures should be applied. Requirements for PIC of indigenous peoples and local communities has been established at the national level by various different instruments, including constitutional law (Venezuela), national indigenous rights law (Philippines), and laws for the protection of rights over traditional knowledge (Peru) and folklore (Panama). The rights of communities to be consulted also arises under ILO Convention 169, which requires consultation prior to the granting of exploration and exploitation rights over natural resources. All of these instruments recognise, in varying degrees, a role for customary law of indigenous peoples in the regulation of access and/or the resolution of disputes relating to the use of resources and/or knowledge.

The applicability of customary law and practice for natural resource management in general and for ABS and protection of traditional knowledge in particular is even more widespread. In Africa, Latin America, Asia and the Pacific regions, constitutional and national law frequently recognises a role for customary law in issues including natural resource management and land and marine tenure. Even where national law does not directly recognise the role of customary

⁹ For more on certificates of origin visit <http://www.ias.unu.edu/research/certificatesoforigin.cfm>. See also: UNEP/CBD/WG-ABS/3/INF/5, UNU-IAS study on the feasibility, practicality and cost of a certificate of origin system for genetic resources: Preliminary results of comparative analysis of tracking material in biological resource centres and of proposals for a certification scheme. Chapter on Certification systems in 2005. International Expert Workshop on Access to Genetic Resources and Benefit Sharing: Record of Discussion, Cuernavaca, Mexico, October 24-27, 2004, available in English, Spanish and French at <http://www.canmexworkshop.com/final.cfm>.

law, it remains the de facto legal regime in many isolated regions, such as amongst mountain communities. In many parts of the Andes and the Himalayas, for instance, customary law and practice plays an important role in fashioning and guiding community relations, land use, water rights and resource rights. These ancient systems of community law are often interspersed with elements drawn from national law in what has been termed by some communities and commentators as “our law” or “indigenous law”. It can be seen, therefore, that under such circumstances, ABS issues must be governed with due respect for and compliance with customary law.

One way of considering the importance of customary law is to look at its role in traditional resource management practices which are responsible for conserving and nurturing much of our biodiversity, including agrobiodiversity. If we consider how indigenous peoples and local communities relate to land and resources we can see that customary law is the glue which stands at the heart of sustainable management of their environment. Traditional resource management may be considered to rest on three pillars. The first is traditional land tenure which defines the area over which indigenous peoples or local communities have rights. The second is traditional knowledge developed by communities over the resources existing in their area of traditional tenure. The third pillar is customary law which defines the manner in which communities and indigenous peoples may utilise their environment and its resources in order to ensure sustainability and the capacity of the environment to meet the present and future needs of the indigenous peoples or local communities.

With the intervention of the State there has resulted in a competition between two sources of law, that of the State and customary law of indigenous peoples and local communities. Finding the balance between these two systems of law and their respective decision making authorities is one of the major challenges facing development of functional law and policy on ABS and protection of traditional knowledge at the national and international level. This issue is now frequently the source of debate at the Convention on Biological Diversity and the World Intellectual Property Organization, and is finding its way into debates of the World Trade Organization. In fact identifying the interfaces between national and traditional decision making authorities and developing mechanisms through which they may become more mutually supportive is increasingly seen as being important for ensuring effective implementation of the Convention on Biological Diversity and protection of traditional knowledge. Accordingly it becomes clear that customary laws will have an important role to play in realising the Millennium Development Goals and the 2010 biodiversity targets.

Likewise, in the development of *sui generis* measures to protect traditional knowledge there is a need to give due attention to the fact that indigenous peoples’ own systems of law are in essence a *sui generis* system, one which has been developed specifically for protection of their knowledge. It is therefore appropriate that such customary regimes be considered as



Giardinia Diversifolia (Allo), Ilam, Nepal. Photo: Elisabeth Kerkhoff

providing a potential basis for any national, regional or international regimes for protection of traditional knowledge. To date, however, there has been a tendency to focus on developing mechanisms to control the scientific and commercial use of traditional knowledge, rather than the development of measures designed to strengthen the knowledge system, as part of cultural heritage, rather than as another marketable good. A further challenge to proponents of customary law as the basis for protection of traditional knowledge is the multiplicity of existing customary law regimes. This would in effect seem to make it impossible to identify a specific body of rules, which could apply to all cases. There will be a need, therefore, to ensure that any regime is flexible enough to ensure respect for and compliance with a variety of differing systems of customary law and practice.

Traditional knowledge databases and registers

The potential role of traditional knowledge registers and databases as a means to secure community rights over traditional knowledge is receiving ever increasing attention both in international fora and in national debates. Registers and databases to compile and protect traditional knowledge have been established by indigenous peoples, local communities, non-governmental organisations, research institutes, and government bodies. Since the early 1990s India has played a leading role in the development of community registers with experiences such as the Honey Bee Network, the Farmer’s Rights Information System, People’s Biodiversity Registers, and the Traditional Knowledge Digital Library (TKDL). The majority of experiences in India may be considered to fall into a general category which may be referred to as cooperative community registers.¹⁰ These experiences tend to involve what are in essence unofficial registers maintained by non-governmental organisations or research institutions in which a record is kept of the relevant information and of the person or community which claims a right over it. Indigenous peoples have also begun to establish their own databases for preservation of knowledge, as part of the process to secure recognition and protection of land rights. One of the most ambitious experiences of this nature involves the Inuit who have established a number of associated databases dealing with different aspects of traditional knowledge, land and environmental issues.

¹⁰ See Alexander, Merle, K. Chamundeewari, Alphonse Kambu, Manuel Ruiz and Brendan Tobin, UNU-IAS - The Role of Registers and Databases in Protection of Traditional Knowledge: A comparative analysis UNU-IAS 2003. Available at http://www.ias.unu.edu/binaries/UNUIAS_TKRegistersReport.pdf



Local market, Pokhara, Nepal. Photo: Zbigniew Mikolajuk

Important efforts have also been made to support the protection of traditional knowledge through the compilation of oral and visual records by institutes such as the Vanuatu Cultural Center and the Australian Institute for Aboriginal and Torres Straits Islanders Studies (AIATSIS).

Community registers, developed and maintained by indigenous peoples and local communities can indeed help to define rights over community knowledge within a community. However, their legal effect as a means for protection of traditional knowledge is limited in absence of recognition of their status under national and/or international law. It is to be hoped that the progressive development of national law, such as the Peruvian law on protection of collective rights over traditional knowledge, which recognises a possibility for development of community registers, will develop into more specific recognition of such registers and of their role as a source of prior art.

To date, the majority of traditional knowledge held in databases is not under the control, direct or indirect, of indigenous peoples and local communities, but is managed by research institutions, national archives, NGOs, commercial organisations and international bodies. Much of this information was collected without any specific agreement with indigenous peoples regarding its use, and is now considered to have become part of the public domain. This poses serious problems for those wishing to protect and control the access to and use of traditional knowledge for spiritual, cultural, economic and other purposes. Such problems are exacerbated as biodiversity conservation enters the era of the knowledge economy.

The importance of clearly defining the public domain in order to ensure continued access for scientific, development and subsistence needs is clear. However, the principle of the public domain cannot be utilised to legitimise the historic expropriation of traditional knowledge. Calls for the redefinition of the public domain or review of its application to traditional knowledge have led to a growing challenge to existing perceptions of the public domain under western legal systems. Legislation, such as the recent *sui generis* law for protection of collective rights over traditional knowledge in

Peru, discussed above, and a draft model law for protection of traditional knowledge in the South Pacific, demonstrate a growing preparedness of authorities in developing countries to find means to redefine the rights of indigenous peoples over traditional knowledge in the public domain. A UNU-IAS report on these issues concluded that “databases and registers alone do not provide a means for the effective protection of traditional knowledge. Rather they must be seen as one element or mechanism in a wider system of traditional knowledge governance including customary law and practice, national access and benefit-sharing legislation, and *sui generis* law and policy”. The report highlighted the catch-22 position faced by indigenous peoples, whereby placing their knowledge in the public domain as a means to securing protection against biopiracy effectively amounts to renunciation of rights over such knowledge. This forms not only a formidable challenge, but poses a fundamental ethical question that the world at large and in particular, the ABS regime development process has to address seriously and in earnest.

Capacity building

In his discussion, Tobin identified capacity building at all levels as a prerequisite for development, adoption, implementation and enforcement of law and policy. Stressing the need for capacity building, Tobin explains that in a recent analysis of national and regional experiences on the development of ABS regimes, the conclusion was that many countries are struggling to develop national ABS policies and laws. Common factors which have prevented the development of effective policies include the lack of technical experience and weak governmental structures and understanding of scientific processes. In many cases, the knowledge of scientific processes and biotechnological discoveries, intellectual property systems or terms of agreements based on markets (or contracts), is limited. There are also limitations on exchange mechanisms and distribution of information. There is still plenty to do before countries adopt flexible and practical, but effective ABS policies. The Conference of Parties to the CBD in its 7th meeting not only recognised the importance of strengthening ABS capacities, but also adopted a framework for development capacities: the Plan of Action to Strengthen Capacities to Access Genetic Resources and Benefit Sharing. COP also reiterated its request to GEF to offer the Parties more support for the development of ABS strategies.

Capacity development at all levels has been one of the principal concerns of countries of the Himal-Andes in recent years. Building national capacity requires attention to a wide range of issues including development, adoption and implementation of ABS law and policy. It also requires negotiation of fair and equitable ABS agreements; enforcement of law and policy and of ABS contracts; acting to prevent misappropriation and unjust enrichment through use of resources in foreign jurisdictions; building national capacity to add value to inventory; collating and adding value to resources and knowledge; and, adopting *sui generis* regimes to protect the rights and interests of the custodians of traditional knowledge. For all of the foregoing it is necessary to have in place the capacity to organise and conduct truly open, informed and empowering participatory processes for all stakeholders. Indigenous peoples have consistently argued in international forums that their interests over their traditional knowledge and landraces should not to be considered as those of stakeholders but rather those of rights holders due to their ancestral rights over their knowledge and resources.

Though the challenges to the development and establishment of a functional ABS seem formidable, the potential for mutual learning between the Himalayas and the Andes, however, promises to make this objective a reality and functional if institutional arrangements can be formulated to facilitate this exchange and strengthen South-South cooperation.

Prospects and challenges for the institutionalisation of information and knowledge exchange between the Himal-Andes and beyond – Strengthening South-South cooperation

Despite the various measures adopted at national, regional and international fora with regard to implementation of various provisions of the Convention on Biological Diversity adopted by over 187 countries in Rio de Janeiro and the efforts to develop and establish an Access and Benefit Sharing regime as a critical and crucial mechanism to meet the commitments enshrined in CBD, the process is far from complete. Oli, in his background paper, points out that post-Rio, and with the successive meetings of the Conference of Parties, there has been a perceptible, fundamental shift in approaches to CBD from one of protectionism and preservation to facilitation of access to and use of resources in a manner that ensures equitable and fair benefits, safeguards rights and custody, and conserves resources for inter-generational use and development. The deliberations in this regard highlight the complexity and the challenges that require immediate solutions. It is obvious that a realistic approach to a quest for satisfactory solutions presupposes cross learning for identifying and avoiding pitfalls, and examining concerns raised by various parties to the satisfaction of all concerned.

According to Basanta Shrestha, a prerequisite in the search for solutions is information. In his opinion, the key to decision making for sustainable development is information. Both Shrestha and Kerkhoff point to efforts made by ICIMOD in this regard and cite the example of the Mountain Agricultural

Systems Information Files and the many initiatives undertaken through the Mountain Environment and Natural Resources Information System (MENRIS). Shrestha points out that initiatives and knowledge management frameworks such as those developed by MENRIS can provide answers to questions such as those raised by Javier Franco in regard to landuse potential in the mountains.

Continuing on the issue of Knowledge Management, Ana Maria Ponce raises the concept of knowledge hubs for housing and facilitating knowledge resources related to biodiversity conservation, and fostering Mountain to Mountain exchanges. Ponce observes that such knowledge hubs already exist in the different mountain regions, hosted by various institutions such as ICIMOD; however, enough efforts have not been made in the past to develop an integrated and 'standardised' knowledge system. This is, perhaps, one of the first requirements for integrating not only information on conservation and biological resources, but also on aspects which are of concern to the process of development of ABS regimes, including law and policy.

The development of such an integrated system would require special efforts of cooperation among regional organisations working in mountains, such as CONDESAN/CIP and the HimalAndes Initiative in the Andes, and ICIMOD in the Himalayas, and so on. Mountain Forum and its regional nodes in the Andes (InfoAndina) and the Himalayas (ICIMOD-APMN), and the Mountain Partnership, are global partners that have a comparative advantage to facilitate interaction and coordination of regional knowledge exchange efforts, starting from the specialised dialogue platforms, and promoting extrapolation of experiences. However, additional efforts would be required to move towards a more specialised knowledge exchange and database sharing among the main institutions involved. This would require involvement of the main actors interested in these inter-regional cooperation efforts: governments, regional organisations and donors.

Nakul Chettri raises a pertinent point in this regard and points out that although the concept of knowledge hubs is fundamental to the process, the nature of certain data, although crucial, are so sensitive that the generation and accessibility to such data may require more than just bilateral agreements and may involve negotiations with governments who may not be willing to allow access to such data. Hans-Jorg Lehmann offers a solution to such situations and provides the example of the Adelboden Group, a coalition of different stakeholders who provide a platform for discussions on policy, policy instruments, experience sharing and preparation of initiatives with the specific purpose of access and benefit sharing in agrobiodiversity with the fundamental objective of promoting sustainable agricultural and rural development in the mountain regions (SARD-M). Harald Egerer provides further examples and cites the case of the Work Programme on Mountains. He opines that this requires further international attention and cooperation. He suggests the strengthening of regional cooperation and provides the example of the progress made in the Alps, Caucasian and Carpathian regions. Camino cites the case of the HimalAndes Initiative (HI) and states that the HI would like to find partners in both regions who have identified specific issues and topics for South-South cooperation in order to prepare joint proposals. Camino further states that the fundamental role of the HimalAndes Initiative is to



Mountain forest, Yunnan, China. Photo: Xu Jianchu

Himalayan region alone, but should span the Andes as well. In the search for such avenues, ICIMOD and similar regional institutions can play a pivotal role in identifying opportunities for economic cooperation through their regular ongoing research endeavours.

facilitate and promote mountain to mountain ‘brotherhood/sisterhood’, and cooperation.

While there are no two opinions on the potential, opportunities and the need for promoting Mountain to Mountain partnerships in the quest for ensuring conservation of biological resources and the diverse farming systems in the Himalayas and the Andes as well as for ensuring sustainable development and the general wellbeing of the mountain populace of both these regions, the challenge is the facilitation of exchanges that would foster the development and establishment of a functional ABS regime benefiting the peoples of both the regions. Institutional initiatives, particularly through coalitions such as the HimalAndes Initiative and mountain organisations such as ICIMOD are critical imperatives. The collaborative efforts of institutions and fora focused on mountain issues and mountain development, exemplified by the present e-conference, is crucial for strengthening the information flow and establishment of what Pisupati terms as the ‘knowledge partnership’. As a next step, such organisations need to seriously examine the possibility of bringing experts, policy makers and practitioners together in a consultative forum to discuss the options, modalities and approaches for addressing the challenges raised in the preceding chapter, particularly the vexing issues of intellectual property rights, bio-piracy, safeguarding the interests of traditional communities and the potential benefits that could accrue from allowing bio-prospecting and utilisation of traditional knowledge systems.

In the context of facilitation of South-South cooperation and regional ABS regime establishment through institutional mechanisms and the establishment of the latter, Oli observes that ICIMOD, by virtue of its management being overseen by a Board of Governors represented by eight member countries in the greater Himalayan region, is in a unique position to facilitate the ABS process in the region. He further observes that increasing regional economic cooperation between the member countries, catalysed and facilitated by other regional fora, could prove useful in strengthening the cooperation for developing common ABS policy in the region in future. The search for such avenues need not be confined to the

Recap

Although exchanges of biological resources between the Himalayas and the Andes have taken place in the historical past, whether intentionally or by default, the vast potential that still remains unharnessed offers tremendous opportunities for enhancing such exchanges in the future. The rich repository of biological resources as well as the associated knowledge base, characteristic of both the regions, offer a hitherto poorly tapped 'window of opportunity' for cementing a South-South cooperation which can contribute not only to the sustainable development of the mountains as a whole, but also benefit the poor and disadvantaged populace of both the regions. The rich heritage of traditional management practices, often encompassing the landscape, is suggestive of the potential for the establishment of 'knowledge partnerships' between the Himalayas and the Andes. This partnership, however, has to be firmly grounded on the experiences from the past, particularly in order to avoid the negative attributes which have often proved more detrimental than beneficial. Unfortunately, very little documentation exists on this aspect of introductions and it is critical, therefore, to assess in depth the impact of such introductions on the long-term livelihood security of mountain communities, both in the place of origin as well as in the area of introduction. The failure to include a sufficiently diverse germplasm as well as the total absence of the associated traditional knowledge base accompanying introductions has adversely contributed to impacts of such exchanges. A critical imperative of future exchanges, therefore, is the inclusion of the traditional knowledge base associated with biological resources.

While there is a growing recognition of opportunities for exchanges, there is also a corresponding realisation that the transformation of opportunities into reality requires pragmatic action particularly in the establishment, strengthening and implementation of legal and normative frameworks of access and benefit sharing. In the post-Rio and WTO regime, biological resources are no longer resources belonging to mankind with unrestricted access. With nations holding the sovereignty over such resources, it is fundamental that frameworks for access and benefit sharing are established at the earliest so that the sovereignty of each nation is respected while facilitating benefit sharing particularly in respect to the communities who contribute to the conservation of such resources through their rich traditional knowledge.

Although most nations in the Himalayas and the Andes have made satisfactory progress in establishing national frameworks and instruments in this regard, some of the countries still require more efforts in order to safeguard their genetic resources as well as establish a functional access and benefit sharing mechanism. In this regard, many countries of the greater Himalayan region lag behind and the region as a whole needs more efforts in setting up a regional framework for the ABS regime. In the context of development of functional ABS regimes, it is necessary to realise that post-Rio and after the successive meetings of the Conference of Parties, there has

been a perceptible, fundamental shift in approaches to CBD from one of protectionism and preservation to a significant emphasis on facilitating access to and use of resources in a manner that ensures equitable benefit sharing, safeguarding of rights and custody while simultaneously ensuring conservation of these resources for inter-generational use and development.

The fundamental imperative in the changed paradigm, therefore, is to ensure that ABS frameworks and regimes enshrine compliance, comprehensiveness and capacity building in the instruments and mechanisms for implementation. The ability of national authorities needs to be strengthened in order to establish mechanisms for ABS governance which can ensure effective compliance by users with ABS requirements. This requires action by countries both as providers and users of resources if an effective international regime is to be established. Two key issues relating to compliance, prior informed consent (PIC) and tracing and monitoring of resource flows, use and benefit sharing through a certificate of origin/source/legal provenance system need to be addressed. Secondly, there is a need for a comprehensive approach to ensure that regulation of ABS is developed in a manner which respects and reflects the rights of local communities and indigenous peoples and is complemented by development of mechanisms to protect traditional knowledge rights. Two key considerations in this area are the role of customary law and practice of indigenous peoples and local communities, and the use of databases and registers for collating traditional knowledge. In addition, the need for capacity building at all levels as a prerequisite for development, adoption, implementation and enforcement of law and policy requires immediate action.

The challenge facing Himal-Andes cooperation is the facilitation of exchanges that would foster the development and establishment of a functional ABS regime benefiting the people of both the regions. Institutional initiatives, particularly through coalitions such as the HimalAndes Initiative and organisations such as ICIMOD, are important. The collaborative efforts of institutions and fora focused on mountain issues, exemplified by the present e-conference, is crucial for strengthening the information flow and establishment of what Pisupati terms as the 'knowledge partnership'. As a next step, such organisations need to explore the possibility of bringing experts, policy makers and practitioners together in a series of consultative forums to discuss the options, modalities and approaches for addressing the challenges partly raised in this e-conference, particularly the vexing issues of intellectual property rights, bio-piracy, safeguarding the interests of traditional communities and the potential benefits that could accrue from allowing bio-prospecting and utilisation of traditional knowledge systems.

Background papers

1. Background paper for session 1 (June 12-13) of the e-conference authored by Alejandro Camino:
Andes-Himalayas exchange and cooperation for the conservation and management of agro-biological resources (Intercambio y cooperación Andes -Himalayas para la Conservación y Manejo de los Recursos Agro-biológicos)
2. Background paper for session 2 (June 15-18) of the e-conference co-authored by Eklabya Sharma and Dipti Thapa:
Comparing historically and recently introduced crops in the Andes and the Himalayas (Comparando la introducción de cultivos a lo largo de la historia y recientemente en la región de los Andes y los Himalayas)
3. Background papers for session 3 (June 20-25) of the e-conference authored by Brendan Tobin and Krishna Prasad Oli respectively:
 - (a) *Regulating access and benefit sharing in the Andes: Exploring the challenges of ABS governance (Regulando el Acceso y la Participación en los Beneficios en los Andes: explorando sus desafíos de gobernanca)*
 - (b) *The legal and normative framework for the use of biodiversity and genetic resources and the status of access and benefit sharing policies (ABS) in the Himalayas (El marco legal y normativo para el uso de la biodiversidad y de los recursos genéticos y el estatus de las Políticas sobre el Acceso y Participación en los Beneficios (ABS) en los Himalayas)*
4. Background paper for Session 4 (June 26-30) of the e-conference authored by Krishna Prasad Oli:
Prospects and challenges for institutionalization of information exchange between the Andes and the Hindu Kush Himalayan (HKH) region (Desafíos y perspectivas para la institucionalización del intercambio de la información entre la región de los Andes y los Hindu Kush Himalayas (HKH))

All the above background papers can be downloaded from:
<http://www.mtnforum.org/rs/ec/mp/ha/bp.cfm>

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