

High Stakes

The future for mountain societies



PANOS

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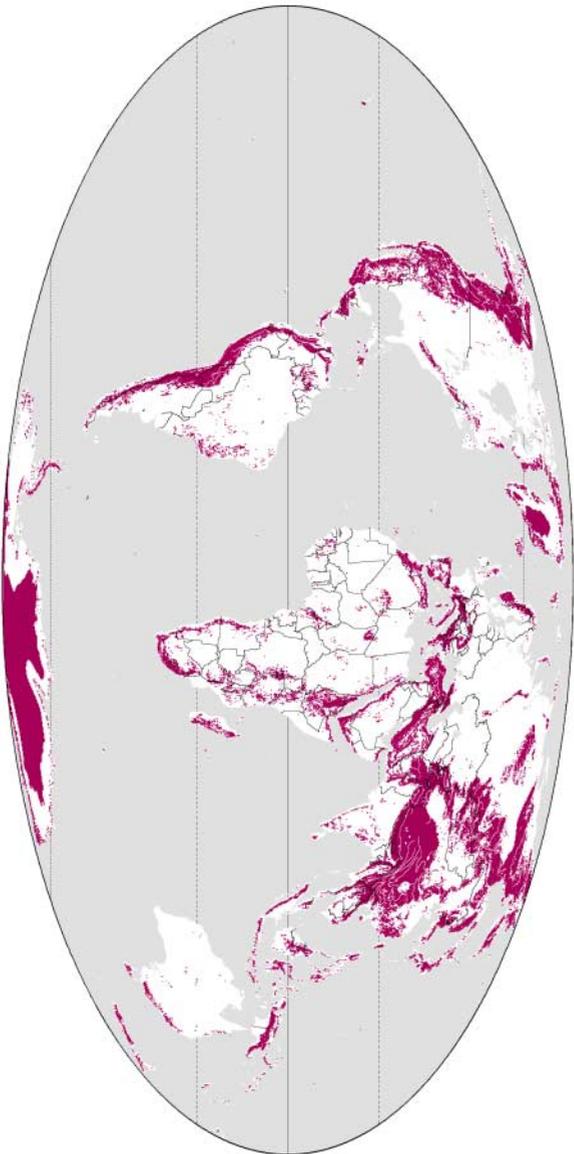
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Mountain areas of the world

Map based on UNEP-WCMC data, 2001



The highest mountains above sea level

- Everest/Sagarmatha/Chomolungma (Asia) 8,850 m
- Aconcagua (Latin America) 6,962 m
- McKinley/Denali (North America) 6,194 m
 - Kilimanjaro (Africa) 5,693 m
 - Elbrus (Europe) 5,633 m
- Puncak Jaya (Australia/Oceania) 5,030 m
- Vinson Massif (Antarctica) 4,897 m

Executive Summary

“Mountains are water towers for humanity, the source of some 60 to 80 per cent of the world’s fresh water resources. They shelter nearly half of the world’s biodiversity “hot spots”. They provide valuable economic resources, too, producing major supplies of minerals, timber, and hydropower. And they are home to rich cultures that are storehouses of traditional knowledge.”¹

Over the last 10 years there has been a recognition that mountains not only possess immense natural resources, they are also essential to the survival of the global ecosystem.

As a result, there has been increasing international interest in mountains, starting with the Rio Summit in 1992, and highlighted with the International Year of Mountains in 2002.

Much of the focus has been on environmental issues. Mountain peoples have had insufficient opportunities to speak out for themselves. And yet they are a vital key to understanding mountains and to their conservation.

For mountains – and their peoples – face accelerating change. Deforestation and environmental destruction from industries such as mining and tourism threaten forests, water supplies and the unique and varied biodiversity of mountain ecosystems.

Natural hazards – earthquakes, avalanches, volcanic eruptions – are coupled with those created by humans, such as climate change and conflict.

Despite the richness of mountain assets, the people who live there face a ‘vertical gradient of poverty’ which puts 80 per cent of them below the poverty line.

The inaccessibility of mountain terrain is only part of the problem. This report examines why mountain peoples are so often on the margins of their societies. Lack of representation, for example, is one issue identified by mountain people themselves.

“The misery that is in [Mount] Elgon, is not because we don’t have assets but because we don’t have people to represent us in government,” says Andrew, a teacher and trade unionist in Kenya.²

Recognising and financing the role of mountain people as stewards of vital global assets such as forests and water could contribute to relieving poverty, as well as ensuring the sustainable management and conservation of natural resources.

More than half of humanity depends on mountains for water – to drink, to grow food, to produce electricity and to generate industry, as well as for transportation.

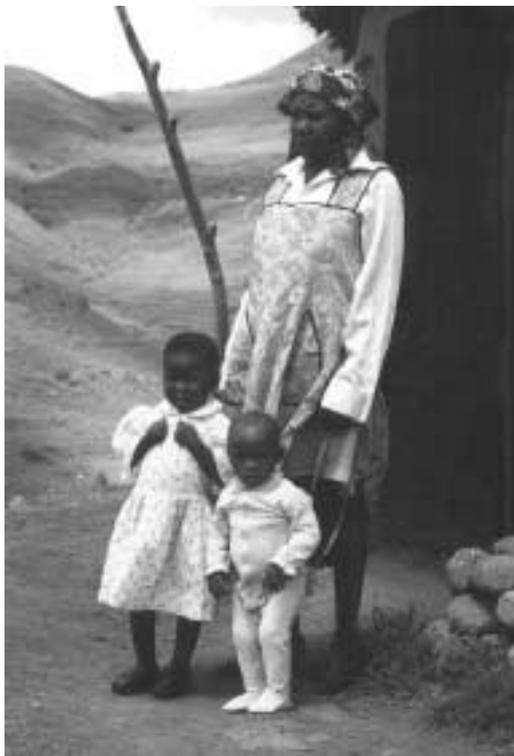
“Those sharing in the benefits of mountain resources [should also] share in the responsibility for their sustainability”, adds the United Nation’s Food and Agriculture Organisation.³

Finally, mountain people’s voices need to be heard. They should be given a say in the issues which affect their lives and livelihoods. If this happens, says Krzysztof Komornicki, head of a local non-governmental organisation in the Sudety Mountains of southwest Poland, change for the better is possible, to the benefit of all.

“The mountains will belong to the people again, but this time it will be more sensible, better planned, taking into account the requirements of a harmony between economic needs and preserving certain basic principles related to the environment and its needs.”⁴

This report is an attempt to listen to mountain peoples – and to show that mountains can sometimes be moved.

K. Warnock



Mother and children in Lesotho: almost entirely dominated by high mountains, it is one of the poorest countries in the world.

Mountain statistics⁵

- 24 per cent of the earth is mountainous
- 1 in 10 people live in mountain areas. About half of these are concentrated in the Andes, the Hengduan-Himalaya-Hindu Kush, and African mountains
- Almost 80 per cent of mountain peoples live below the poverty line⁶
- All the world's major rivers rise in mountain regions
- In humid parts of the world, mountains provide 30 to 60 per cent of the fresh water downstream. In semi-arid and arid environments, they provide 70 to 95 per cent
- Chronic water scarcity is predicted to affect 3 billion people by 2025
- 11 of the 18 regions identified by the United Nations as in desperate need of humanitarian assistance in 2002 are mountainous (Afghanistan, Burundi, the Democratic Republic of the Congo, Eritrea, Ethiopia, Indonesia, North Caucasus, North Korea, Southeastern Europe, Tajikistan, Uganda)⁷
- 23 of the world's 27 major conflicts in 1999 were in mountain areas⁸
- In 1995, the inability to manage mountain waters was the source of 14 international conflicts
- Mountain tourism accounts for 15–20 per cent of the world's largest industry – \$70–90 billion per year
- Mountain forests stretch over 9 million square kilometres, representing 28 per cent of the world's closed forest area. Almost 4 million square kilometres of mountain forests are found above 1, 000 metres
- Mountain cloud forests are disappearing faster than rainforests – at 1.1 per cent per year
- Of the 20 plant species that supply 80 per cent of the world's food, six originated in mountains

Most of this information can be found on:
www.mountains2002.org

Introduction

The first concrete acknowledgement of international concern over the sustainability of mountain development took place at the Rio Earth Summit of 1992, with the inclusion of a chapter relating specifically to mountains in the Plan of Action.⁹ Since then, this has been overseen by the Food and Agriculture Organisation (FAO) of the United Nations (UN). It convened an interagency task force, including non-governmental organisations, and consultations at regional and global levels have also taken place.

In 1995, these processes led to the establishment of the Mountain Forum, a global network for information exchange, mutual support and advocacy towards sustainable mountain development and conservation. “By mid-2001 this rapidly growing structure had over 2,500 individual and 100 organisational members from more than 100 countries.”¹⁰

In 1998 the UN declared that 2002 should be International Year of Mountains (IYM). IYM’s main objectives are to ensure present and future well-being of mountain communities by:

- promoting conservation and sustainable development
- increasing awareness of, and knowledge on, mountain ecosystems and their importance in providing a number of goods and services essential to the well-being of rural and urban, highland and lowland people, particularly water supply and food security
- promoting and defending cultural heritage of mountain societies
- paying attention to frequent conflicts in mountain areas and promoting peace-making in those regions.

At least 65 countries have, or are establishing national committees for the IYM and a range of local to global events are taking place to further catalyse actions towards sustainable mountain development. The next Earth Summit in Johannesburg, South Africa (26 August–4 September 2002) will also concentrate on many issues that concern mountain peoples.

The key event of IYM is the Bishkek Global Mountain Summit (29 October–1 November 2002 in Kyrgystan). The purpose is to bring together the ideas and recommendations generated throughout 2002, and put together proposals for concrete actions to ensure sustainable development and management of mountain regions in the 21st century.¹¹

What is a mountain?

Within and between the world's mountain ranges there is huge physical, environmental and socio-cultural variety. Take, for example, the Pyrenees and Papua New Guinea, the Himalaya and Hawaii, the Andes and the Alps – the diversity speaks for itself. Mountains include the wettest and driest places on earth: Cherrapunji in the Indian Himalaya and Mount Waialeale on Hawaii's Kauai Island both receive up to 12 metres of rain annually, whereas parts of Chile's Atacama Desert in the Andes have had no measurable precipitation in at least 27 years.¹²

The most common classification used to define mountains is highlands and elevated ice shields above 2,500 metres, along with hilly areas below this altitude. In a recent publication scientists used altitude, slope and local elevation to define 24.3 per cent of the earth's land and ice surface as mountain areas. This includes areas above 2,500m, gently sloping older mountain ranges such as the Appalachia in the US and hilly areas at lower elevations such as the Scottish Highlands.¹³

Most threatened mountains

The European Alps by growing tourism, air pollution and the decline of traditional farming systems as a result of migration

The Himalaya-Karakorum-Hindu Kush chain by war, deforestation, drought, logging, overgrazing, out-migration and the inequitable treatment of mountain minority peoples

The Rockies and Coast ranges, western US, due to development, including recreational activities and house construction on prime land, as well as climate change

The Great Smokey Mountains, eastern US, due to air pollution

The Amber Mountains, Madagascar, where 80 per cent of the forests have been lost to farming, mining and charcoal production

The Snowy Mountains, Australia, where 250 plant species are threatened by a series of warm winters

The Western Carpathians/Tatra Mountains, the Slovak Republic and Poland by the growth in tourism and air pollution

The Sierra Chincua, Mexico, where logging and agricultural expansion have destroyed 44 per cent of the forest

The Pamir Mountains, Tajikistan, where civil war has resulted in widespread devastation and poverty

The Hengduan Mountains, southwest China, where a push to rapidly develop tourism threatens mountain peoples' cultures.¹⁴

The Vertical Dimension

1 Mountains of diversity

Mountain areas are rich in assets. These include ‘environmental’ resources – biodiversity (or genetic resources), energy, food, fuel, minerals, plants, timber and water. But they also involve less tangible but equally valuable assets – ‘leisure’ resources such as tourism; ‘spiritual’ resources including religious sites; and ‘human’ resources including specialist knowledge of sustainable practices and medicinal treatments. Many mountain regions are also home to an immensely diverse range of cultures and ethnic groups.

The remoteness and the relative self-sufficiency of many mountain communities have led to the development and maintenance of strong cultural identities. Many areas also have a long history of trading relationships with other regions, which has enriched their own communities and cultures and led to the settling of different groups in highland locations. The mix of ethnicities, religions and languages of those living along the ‘Silk Road’ of Asia, or the many minority communities of the Caucasus illustrates this history of exchange, migration and settlement.

More than half of the world’s natural protected areas are in mountains, including 40 per cent of all biosphere reserves.¹⁵

Mountains are key areas of global biodiversity too. The vertical dimension of mountains makes them different to surrounding lowland ecosystems; the rise in elevation in mountain areas produces altitudinal zones of different climate, soil and terrain, sometimes over very short distances. Different varieties of flora and fauna adapt to each of these environments.

Mountains are often referred to as ‘islands’ of biodiversity rising above ‘seas’ of lowland landscapes that have been transformed by centuries of human use. For example, the last few hundred of the world’s mountain gorillas can be found in the volcanic regions of Rwanda and Uganda. Mount Kinabalu in Sabah, Malaysia is estimated to harbour over 4,000 plant species – more than a quarter of the species found throughout the entire United States.¹⁶

Mountain regions are genetic store houses: they contain many threatened wildlife species and a vast range of plant species, including crops and medicinal plants. The primary guardians of these

irreplaceable global assets are mountain people, who continue to play a vital role in the maintenance of mountain biodiversity.

Farming skills

While verticality produces a great range of diversity in mountain areas, within any given altitudinal zone the biodiversity may be small and so quite vulnerable to disruption. Farmers cultivate a range of different crops, some of which are appropriate for specific elevations and climates, thereby spreading the risk of any single crop failure. For example, an Andean farmer may grow up to 50 different kinds of potato.¹⁷

Cross-fertilisation between wild and domestic varieties of crops is often encouraged. In Mexico farmers allow *teosinte*, an ancestor of maize, to grow alongside their domestic maize crop; they believe this practice increases the yield of their corn.¹⁸ In some areas they have also domesticated certain wild plants. Employing these strategies “encourages new characteristics to emerge while strengthening a species’ genetic diversity and resilience”,¹⁹ and in some cases improves yields and minimises the need for chemical pesticides and fertilisers.

As modern high-yielding crops face evolving diseases and pests, the biodiversity in mountain regions will become even more important. “Often, the genes that provide resistance to these new diseases can be found among traditional, mountain-growing species.”²⁰

Mountain farming techniques have been refined over time, based on local people’s in-depth knowledge of the variations of climate and terrain, and using methods such as migratory grazing; irrigation; shifting cultivation; terracing steep slopes; and sustainable harvesting of food, fodder and fuels from mountain forests. Relative geographic isolation and precarious conditions of production mean most highland communities have engaged in both agriculture and pastoral activities, thereby taking advantage of different altitudinal zones. Livestock play an important role in many mountain areas, providing:

- high energy foods (meat and dairy products)
- animal power – for transport, ploughing etc
- organic fertiliser, and in some places fuel, in the form of dung
- material for producing warm clothing in harsh climates

Transhumance – the seasonal movement of people and livestock between different pastures – is common to many mountain communities. For some semi-nomadic groups, such as Tibetan and Nepalese yak-herders and salt-traders, these movements can involve large distances.

Joining the market economy can change diverse subsistence farming systems into ones that focus on one or two cash crops, often involving costly inputs. While the cultivation of cash crops is vital to the survival of many mountain communities, it may be risky as a household's only livelihood strategy. Agricultural interventions therefore need to involve a variety of strategies and be location-specific: "Modern inputs cannot be effective unless they are developed for or adapted to specific local ecological problems and human needs."²¹

Working together

Cooperative approaches to resource use are a recurrent feature of mountain societies. Ram, from Nepal, points out:

"Sometimes...I am not able to do my work by myself. Then my neighbours will decide to help me. If they do not help me I will be ruined. So this is a good system. When the time comes I will also help them. We have a good cooperation between us."²²

As in many rural areas, the pooling of human resources and reciprocal labour exchange allow individuals and the community to cope with periods of heavy work, such as harvesting, constructing irrigation channels or terraces and managing the fields of the ill, the handicapped or the bereaved. Many mountain societies also have collective systems and institutions for irrigation, forest-use and grazing to govern the management of key common resources. Only by working together could communities survive; today such collective systems and responsibilities are coming under increasing strain.

Pressure on resources has sometimes led to the adoption of short-term actions, despite people's recognition of the negative consequences, as Zhonglan, from Fale village, in Guizhou province in China, notes:

"Because our financial situation was not good, we had to cut down the trees and take them to Maguan. We sold them to the factory...In the past, we had no food to eat. If a person didn't cut down some wood to sell, what could he eat? So we cut all... Now we have a better living standard; we ourselves plant trees."²³

Poverty, increasing local populations, and selective depopulation have all played their part in the erosion of sustainable practices. So have incursions by outsiders. When Miao villagers in China's Hengduan mountains, Yunnan, found their forests being depleted in truckloads by people from the plains taking advantage of the forestry department's new roads, they felt: "Why should we protect the forest for other people? We planted the trees, those were our mountains. When people came [from the plains] to cut, our people were angry. People here thought: if you cut, we can cut too."²⁴

Conservation

Conservation too has to achieve a balance between local and wider needs if it is to succeed. Increasingly, it is about seeing people as an integral part of a mountain ecosystem rather than excluding them from certain ‘protected areas’. The more traditional approach did not always recognise the reliance of local populations on a protected area, either for forest products or grazing.

Biosphere reserves recognise the key role of people in areas of high biodiversity. They consist of core, buffer and transition zones that meet the need for different levels of protection as well as for human activity in each zone.²⁵

To ensure that mountain people do not have to make difficult choices between their own survival and that of mountain ecosystems, conservation has to be materially beneficial for them – for example through a rights and royalties system; tourism and trophy hunting; the cultivation and sale of medicinal plants.

Carpathian carnivores

In the Romanian Carpathian Mountains, the Carpathian Large Predator Project is working to maintain the high numbers of large carnivores in the region. The project aims to illustrate that conservation of predators can pay and is not necessarily in conflict with the livelihoods of local farmers and shepherds. The Carpathians are among Europe’s most pristine ecosystems, and home to almost one third of all European carnivores: “The authorities estimate that the number of bears is over 5,000, that there are about 3,000 wolves, and some 2,000 lynx. This is the highest concentration of large carnivores anywhere in Europe.”²⁶

The challenge for conservation in these areas is two-fold: changing the reality of the livestock-predator relationship, and working on people’s attitudes towards these predators. The provision of electric fences to certain shepherd camps has offered enhanced protection from predators, reducing livestock kills. And in the main project site, benefits from ecotourism and trophy hunting now far outweigh any losses. Predators have become an asset for the local population rather than a menace.

Given that the greatest threat to mountain ecosystems comes from external demands for resources, it is not surprising that some mountain communities are sceptical of conservation measures imposed from outside. This is especially so when they feel environmental management is being presented as a modern science, with outsiders ignoring their own skills and experience.

Shimshal Nature Trust



This was the case in Shimshal, a mountainous village of Northern Pakistan, situated close to the Chinese border where the Pamir and Karakorum mountain ranges meet.

The community has been the sole steward of vast areas of high altitude pasture and depends on transhumant livestock herding as well as agriculture. These pastures are also home to several endangered wildlife species. Since 1974 there have been plans to include most of Shimshal's pasture areas in the Khunjerab National Park (KNP) yet Shimshalis themselves were never consulted.

Khalik (above), a headteacher in Shimshal, describes the community's response to the Park; "When this Park was established it created much worry in the village, because they were trying to deprive us of our grazing and cultivating lands in the pasture which we are using since hundreds of years..." Rather than simply oppose the authorities, they decided they "should prove that we are the best managers of this land, so we promoted Shimshal Nature Trust and we wrote the management plan."²⁷

The Shimshal Nature Trust (SNT) came about as a response to the continual portrayal of Shimshalis and their neighbouring communities as "incapable stewards of their ecological environment, guided – or rather misguided – solely by short-term instrumental motivations".²⁸ The management plan was formulated to "formalise all those environmental beliefs, knowledge and practices of the Shimshal culture and tradition into a language and structure that is accessible to the international ecological community".²⁹

Although more recently international agencies have adopted community-based planning and management procedures, SNT feel "that it is not enough that external initiatives be managed locally; rather, a culturally and contextually-sensitive nature stewardship programme should be developed and initiated, as well as managed, from within the community".³⁰

2 Living on the edge

It is estimated that 80 per cent of the world's mountain populations live below the poverty line.³¹ Jane Pratt, former director of The Mountain Institute in West Virginia, US, notes that, despite the many resources that mountains hold, "in most countries, there is a vertical gradient to poverty".³²

In mountainous Ecuador, Guatemala and Peru, almost 90 per cent of farms are too small to provide an adequate income. Most of the 98 million Chinese considered to be among the world's 'absolute poor' are ethnic minorities living in the mountains.³³

Lemlem, aged 67, from the mountains of Ethiopia, echoes many of her neighbours when she notes how her village has become increasingly poverty-stricken:

"In the old days... a land tilled with just a pair of oxen used to give double the usual yield, which filled up the underground granary. Today the land has become like leather – it gives no yield... The soil has been washed away and the land has become barren... Now even the livestock are no good. Fathers and mothers do not help each other. Why is all this so? Because of poverty."³⁴

Women and poverty

Women's access to health services in rural and mountainous areas is seriously inadequate.³⁵ There is unfortunately little in the way of disaggregated statistics on gender and longevity in the mountains compared to the lowlands. However, a recent study in rural, and mountainous, Myanmar, found that female life expectancy was two to three years shorter for rural women than for urban women, and that the maternal mortality rate was double that of urban women.³⁶ And Nepal is one of only 6 out of 162 countries where life expectancy for women is lower than for men.³⁷ This is largely because of the scarcity of medical facilities and high numbers of women dying in childbirth.

A significant proportion of those countries ranked as 'low' in the Human Development Index include landlocked and/or mountainous countries such as Nepal, Bhutan, Yemen, Rwanda, Burundi, Ethiopia and Eritrea.³⁸

Such tables don't show the comparatively greater poverty of mountain populations within countries such as Myanmar, Thailand, India, and Argentina for example. Even in industrialised, wealthy countries, mountainous areas have been characterised by historical and continuing inequalities: parts of Scotland, for example, and the highlands of Norway, Germany and France. In the eastern US, the Appalachia, which are among the oldest mountains in the world, have been called "marginal in the midst of plenty", with lower than average levels of educational access, and high rates of unemployment and substandard housing.

Mountain terrain makes the delivery of services both expensive and difficult. Building any infrastructure is complicated by the problems of getting materials to sites, and anyone from outside working in mountain areas has to be prepared to spend long periods away from home.

As a result, mountain peoples may be bypassed by both governments and development organisations that prefer to spend scarce funds in easier environments. Yet there are stark needs for development in many mountain communities – especially for education and health facilities.

Within mountain areas, as elsewhere, urban areas are better served educationally and medically, which contributes to the population flow within mountain areas from rural to urban centres.

High roads to change

"When I was a child I have travelled on foot to Kaskes. There was no road then. People carried food for themselves and for their animals and travelled for a week or a month through the forest and the desert. Some even died..." said Ayichesh, from Ethiopia.³⁹

Mountain peoples have always travelled, but their routes were often long and arduous, as they carried goods from some of the remotest places in the world across some of its most difficult terrain. But in recent decades, the scale and extent of road building has brought huge changes to the mountains. Roads have eaten up the distances between mountains and the lowlands. They have brought with them the many advantages of being connected to others more swiftly and simply, but also imported all the challenges and pressures that this implies. In this sense, the road serves as a metaphor for the changes facing many mountain societies today.

Many of these have been positive, as Ayichesh points out: “Now, because there is a road, they brought barley from Addis Ababa and dagussa (finger millet) from Gojam by vehicles here and saved our lives when the land refused to produce food.”⁴⁰

For people living in previously ‘isolated’ mountain areas, roads can provide a range of benefits:

- increased employment and income opportunities
- access to health and education facilities and consumer goods
- exposure to the wider world and learning opportunities
- provision of external support during/after a disaster or famine
- greater opportunities for regional cooperation and economic exchange

Improved access to mountain areas has made labour migration to surrounding areas easier and has also facilitated the development of markets, industry, and tourism, thus providing much-needed local employment and increased economic diversification. But the coming of roads has also made some mountain societies vulnerable to exploitation by outsiders.

Xuefeng, from Yunnan in China, notes: “Before, when there wasn’t the road, when people from the plains came to steal, they would steal only one or two trees. Now one truck can carry 10 people, [so] many trees were easily taken... Now it’s barren. People are rich, but the resources are used up.”⁴¹

“The people complain there are no roads, no schools and no hospitals. People believe that if there are roads in the village, development has taken place. But what is the direct benefit of having a road in our village?” asks one Himalayan farmer.⁴²

“The people here are connected not with roads but with their forests. The grass will go, the trees will go, the stone will go from our village.”

He warns that only when the villagers can utilise their resources and have goods to sell – vegetables, woven baskets, carved stone handicrafts – would the road also bring them, rather than outsiders, economic benefits.

But ultimately, for mountain people who have had to carry sick people, women in labour, and all goods into and out of their communities, the benefits of a road are too great to turn down even if people are aware of the negative impacts.

“The hospital is far away... if a seriously sick person needs to go to the hospital, it takes at least 15 or 16 people to carry him or her... In this place, because there is no road, living conditions

are worse. Everything needs to be carried by people. There are potatoes [to be sold] but they are too heavy to carry. If there is no horse, you cannot carry them by yourself," says Guangzhen, from China.⁴³

Virtual accessibility

The costs of developing Information and Communication Technologies (ICTs) in mountain regions are likely to be higher than in the lowlands; similarly the revenues generated may well be lower. However telephone and internet connectivity in mountain regions has significant social payoffs. ICTs can:

- provide market information to remote, rural producers
- enable local tourist operators to promote their services to a large audience cheaply
- provide contact with government representatives and opportunities to participate in decision-making processes
- enable governments to obtain up-to-date information about rural areas to inform planning and decision-making
- enable healthcare services to reach wider audiences
- provide educational opportunities
- enable cheap and easy contact between relatives living in different places

In the small remote community of Bario in the Kelabit Highlands of Malaysia's northern Sarawak province, a project known as e-Bario has been developed by the Canadian Government's International Development Research Centre (IDRC). At 1,000 metres above sea level and surrounded by mountains, Bario is unserved by roads. It suffers from out-migration by youth to urban centres. The e-Bario project has three main components: the testing of satellite technology for better telephone access and internet connectivity; the development of a community telecentre; and internet access using school computers. It is complemented by research carried out by the University Malaysia Sarawak, which aims to demonstrate the potential contribution of IT in rural communities to sustainable development.⁴⁴

Political marginalisation

"...the misery that is in [Mount] Elgon, is not because we don't have assets but because we don't have people to represent us in the government," says Andrew, a teacher and trade unionist, Kenya.⁴⁵



Heavy load – without roads, all goods have to be carried, often over long distances.

Mountain communities, both women and men, often find themselves politically marginalised, excluded from the centres of politics, power and decision-making. Physical distance and poor communications may make political participation more difficult, but simple lack of political will to include highland populations in national affairs has often been the main factor.

There have been powerful mountain states – Ethiopia and the Inca empire of the Andes for example. In both cases, they were based in highlands characterised by large plateaus, which offer much more scope for urban development than a series of narrow valleys. But today “only a few mountain or highland states exist which are controlled from the mountains – Bolivia, Ecuador, Colombia, Yemen, Bhutan, and, to a lesser degree, Nepal and Afghanistan”.⁴⁶

Sometimes the political marginalisation reflects the fact that many mountain regions are home to minority and indigenous peoples, groups that governments have often been wary of, or neglected, or even actively discriminated against.

Historically ethnic minority groups of Thailand (many of whom reside in highland areas) were not considered Thai citizens. This was amended by the Nationality Act of 1965 but the influx of immigrants from Myanmar, Laos and China has caused officials “to be more critical in granting citizenship”, making the process extremely difficult for people, however legitimate their claims.⁴⁷ In 1997 only 30 per cent of ethnic minorities living in Thailand had citizenship.⁴⁸

One way to counter such marginalisation has been to campaign for better representation through the creation of different administrative boundaries that make greater allowance for mountain-specific interests. For example, the Sabaot of Mount Elgon, Kenya, were recently granted their own district status, rather than being part of a larger administrative unit which they believed was dominated by other interest groups. On a larger scale, the inhabitants of India's new state of Uttarakhand, carved out of Uttar Pradesh, waged a long and ultimately successful campaign for separate political representation.

Uttarakhand, a mountain state

Uttarakhand, a predominantly mountainous region, became India's 27th state on 9 November 2000, after a long struggle for self-representation. With a population close to 7.5 million, the state is rich in natural resources with glaciers, peaks, forests, national parks, major rivers and four of India's most sacred Hindu temples. Apart from tourism, most of the population is employed in agriculture. While the industrial sector is insignificant, the state believes there is great potential in the development of horticulture, the herbal pharmaceutical industry, tourism and hydro power.

Since the new state's establishment, however, there has been growing concern that the forms of development to be pursued do not take sufficient account of a more equitable and mountain-specific approach. Friends of Uttarakhand (FOU), a forum of scholars and activists, conducted one of many exercises in grassroots democracy involving public seminars and hearings leading up to the state's first assembly elections in February 2002. Uttarakhand is the ancient name for the region; Uttarakhand was the name chosen by central government.

FOU, the Uttarakhand Support Committee, and other groups have all expressed concern that without wider debate and participation, Uttarakhand's development may mean no more than "the indiscriminate exploitation of natural resources, the abrogation of people's rights, or following the tired old model of development that has plundered the hills for 150 years".⁴⁹

Cultural marginalisation

Historically, many lowland or city-dwellers have held dismissive views of mountain peoples, seeing them as 'backward' or 'conservative'. Many languages have derogatory terms for

mountain peoples – from the ‘hillbillies’ of North America to India’s ‘pahariya’, from the Hindu ‘pahar’, meaning mountain.

The following quote from Ah, a woman of the Lahu minority group, in China’s Yunnan province shows how negative such stereotyping can be:

“People who live on the plain wear better clothing, they have more access to outside information and have a better life. People who live in mountain areas, because they don’t have access to information, they cannot see what others do well – they appear to be more foolish.”⁵⁰

Mountain societies have been cast as people suspicious of outsiders and ignorant of events beyond their valleys. Self-sufficiency and independence have been misinterpreted – or re-defined by groups with an interest in so doing – as troublesome nonconformity. Commercial and industrial interests seeking to exploit local resources, such as the coal companies who started mining North America’s Appalachia mountains in the 19th century, wanted to control their workforces and justify bringing in outsiders when it was to their benefit. The more they painted a picture of apathetic workers of low intelligence, the more it justified policies of company control over every aspect of the workers’ livelihoods (from jobs to shops and housing) and environments. Indeed, some feel that highlanders are almost by definition either a minority group or are treated as one, as in Appalachia, frequently outside the dominant cultures of the plains and city peoples.

Migration – in search of better pastures

“[Young people] leave to find work, they... don’t go because they hate their land.... Some go because they want to know the capital, but the majority go to escape the poverty, don’t they?” says Delma, the leader of a welfare organisation in Peru.⁵¹

Depopulation is a significant phenomenon for mountain communities globally, as people leave rural areas and small villages for larger urban centres, and highland areas for the lowlands. Mountain communities have long functioned as a reserve army of labour, including soldiers, for the lowlands – but more people are migrating; in some places more, mainly young, women are joining the ranks of migrant labourers; and more temporary or seasonal migration is turning into permanent migration.

Almost every family in the Atlas Mountains in Morocco has a male family member working elsewhere.⁵² Turkey has a pattern of extensive migration, primarily from mountain forest areas. Mevlut Duzgun from Turkey’s Ministry of Forestry says the reasons people

leave are lower living standards, difficult living conditions, lack of job opportunities, scarcity of good agricultural land, and the desire to have access to modern facilities: "...in the case of Turkey and many other non-industrial countries...rural settlements, remote and mountain communities are certainly the poorest... Out migration from these communities is visible proof of this."⁵³

Similar migration is also happening in the Alps, with indications that populations are moving from small farming villages into a handful of economic centres.⁵⁴ The traditional economy and way of life has broken down in about 40 per cent of the area. The declining economy is mirrored by population decline, sometimes a 60 to 80 per cent drop in numbers over the past 100 years.⁵⁵

Population pressure

Mountain regions are not always sparsely populated, however. While overall densities tend to be low, the habitable parts of mountains can be very densely populated. In large parts of the Andes, Carpathians (Europe), Chinese and former Soviet Union mountains, High Atlas (North Africa), Himalaya-Karakorum-Hindu Kush and Middle Eastern ranges, there is a high population density and consequently a strong pressure on land and other resources. This contrasts with a far lower population density in the high mountains of New Zealand and North America.⁵⁶

The Central Andes, for example, is characterised by large plateaus above 3,500 metres, which are the most densely populated areas of the whole Andes range and which contain some significant cities, such as Cuzco and La Paz. In Peru, where 50 per cent of the population lives in the mountains, 33 per cent inhabit these high plateaus, where they grow frost-resistant crops, especially potatoes, and graze hardy llamas, alpacas and sheep. Only in mountain regions where the agricultural potential is greater than in the plains, most notably in parts of Africa, is population density likely to exceed that of the lowlands. For example, the Virunga volcano region of Rwanda has a population density of 400 people per square kilometre.⁵⁷ This is approximately twice the density of Boston in the US.⁵⁸

Although remittances from migrant workers can be significant, the disruption can have long-term negative consequences. The burden of work on those left behind is increased, social networks and organisations can be undermined, and previously sustainable practices can break down, particularly if they depend on collective action and responsibility.

Migration also has a strongly gendered effect. It is generally the women and older people who are left to provide for the family and who continue to farm the land or herd the livestock. 28-year-old Diao'er from Taiheng mountain, Hebei province in China, says: "Since almost all the men have left the village with only the old and the young at home, all work in the fields is left to women..."⁵⁹

China on the move

China's mountainous regions contain some of its poorest populations, and while most families see male migration as essential for survival, increasing numbers of young women are taking jobs in the country's factories and cities. Junrong, a 36-year-old woman from Taiheng mountain, explains: "... We can hardly make a living on the little land we have. It would be really hard without trying to earn some money outside... On the whole people are not able to find really good jobs. There are so many people working outside".

She feels that female migration can be good: "We do not think there is anything improper [in them going out to work]. These mountains shut us off and there may not be much room for further development. It is good that the young people go out to see the world, finish their schooling and gain experience and knowledge. Also they can earn some money to help the families".

But ultimately, she says, it is not a question of choice. The men have to go: "Most of the money people earn by working outside is spent on food. How can you save money if you still cannot get enough food from the fields?"⁶⁰

Although the main reason for migration is economic, money is not the only factor. The desire for education is a powerful motive, as well as the attraction of the metropolis and individual choices to be at the centre of their nation, not on the margins. Many places of higher and even secondary education are in the lowlands and so many young people have to leave the mountains to complete their studies. Once educated and with experience of a more urban or modern lifestyle, it is not difficult to understand that a life of farming in a remote mountain area might hold less appeal. But there are exceptions: people who are committed to increasing the educational opportunities and development potential in their community and who return to teach and work there. But there are many more who do not return because of the lack of job opportunities or economic options.

4 Natural hazards and human disasters

Mountain peoples face hazards that stem largely from natural causes, such as earthquakes. But they also face disasters that are caused entirely by humans, such as conflict, that have even more serious implications.

Mountains are dynamic environments, much more susceptible to natural hazards than lowland areas. Risk assessment and management are especially important in these areas. The collision of continental plates, which created mountains in the first place, and seismic activity, continues to cause earthquakes and volcanic eruptions. Steep mountain slopes promote the rapid movement of rocks and soil as well as the large amounts of water and snow which fall in mountain areas, causing avalanches, floods and landslides.

These natural disasters are by no means isolated incidents.⁶¹ Using figures obtained from the United States' Office of Foreign Disaster Assistance Agency, Kenneth Hewitt, a geographer, estimated that earthquakes, floods and other natural disasters in mountainous countries caused the deaths of around 1.6 million people between 1900 and 1988.⁶²

Mountain environments today face an escalation of these risks from the increase in lowland and highland populations, and related infrastructure, the intensification of land use and resource extraction, and air pollution and global warming. Moreover, the problems of access and communication in mountain regions make it especially hard to relieve those suffering as a result of any disaster.

Although disasters are often portrayed as indiscriminate, with death or survival being seen as a matter of luck, Hewitt says that the damage depends upon the "presence of human communities, their properties and activities..."⁶³ In other words the extent of damage is related to the social, political and economic – as well as environmental – circumstances which combine to create vulnerability.

Earthquakes and volcanoes

Earthquakes have been identified as the most frequent and destructive disasters in mountain regions. Earthquake tremors can cause avalanches and landslides – not a significant risk in lowland areas. Other factors such as land-use, settlement patterns and construction design, which determine the extent of the destruction.

Most damage occurs in the heavily populated lower settlements/urban areas rather than high in the mountains.

First the earthquake, then the disaster

On 31 May 1970 an earthquake in the Peruvian Andes measuring 7.7 on the Richter scale caused immediate massive avalanches and floods, destroying nearly 2,000 cities and villages, killing 70,000 people and injuring twice as many. 800,000 were left homeless.⁶⁴

The devastation was as much the result of underdevelopment stemming from the time of the Spanish conquest as it was the earthquake itself. Early Andean peoples exploited the variety of micro-environments offered by the mountains – the ‘principle of verticality’. They spread their resources over a wide area, reducing the impacts of localised floods, frosts and landslides. Settlement patterns also followed this principle with rural households dispersed along hillsides as well as in valleys. The Incas were careful not to develop urban settlements in areas of high seismic activity. Inca building techniques and materials minimised the damage caused by earthquakes.

The Spanish conquest and the end of the Inca empire resulted in the destruction of these environment-sensitive systems. In the 1570s, the Spanish resettled Andean communities into new urban centres where they could be more easily controlled. Some were developed at the confluences of rivers – places vulnerable to flood and landslide. Spanish traditions of building were more suited to lowland areas; houses were built close together and sometimes of two storeys, using ceramic roof tiles. Narrow streets, heavy roofs, and seismic tremors are a dangerous combination.

The 45 seconds of the 1970 earthquake destroyed much of the infrastructure of a region larger than Belgium and the Netherlands. The worst of the avalanches descended from Mount Huscaran, Peru’s highest mountain, and buried the city of Yungay and roughly 4,500 of its 5,000 inhabitants. In the city of Huaraz some 10,000 people lost their lives through walls collapsing into narrow streets, and heavy roofs falling on those who remained within their homes.⁶⁵

Volcanoes are built by the accumulation of lava and ash that breaks down to form some of the most fertile soils on earth. This explains the high population densities around them. Volcanic eruptions cannot be prevented, but the number of victims and the damage incurred can be reduced through better planning and preparedness and using advice from local people.⁶⁶

Living with the Fire Mountain

Merapi (Fire Mountain) at 2,950 metres, is the most volatile volcano on Indonesia's island of Java, and with 600 people per square kilometre has one of the highest population densities in the world.⁶⁷ People living in the area know the dangers of the volcano, yet their livelihood depends on farming the fertile soil around it, which also provides sand for quarrying business, stone for masons and a water reservoir. The volcano also has significant spiritual meaning for the local community.⁶⁸

Until recently the Indonesian government responded to disasters with a policy of evacuating affected populations and resettling them in a different part of the country. Volcanologist Eko Teguh Paripurno, sceptical of such top-down management of disasters by outsiders, has worked towards a different approach, one which places local people, those most affected, at the centre of disaster management. Since 1994 Teguh has been training communities living on the slopes of Merapi volcano to “prepare for, respond to, and recover quickly from natural disasters”.⁶⁹

More than 200 people have been trained in disaster preparedness, potentially benefiting 12,600 people living in villages on the volcano's slopes. In February 2001 residents of two villages demonstrated their new skills through early detection of an eruption and orderly evacuation to shelters – no emergency assistance was required. “Having identified roads as a factor hindering rapid evacuation during a volcanic eruption, vulnerable communities lobbied the district government to support improved road construction, and received a favourable and quick response”.⁷⁰ This is key to Teguh's work: involve communities in research and planning and then support them in lobbying the local government so “they develop policies and laws based on real needs”.⁷¹

Given the steepness of mountain slopes, fast water movement can collect and carry large particles with immense erosive power, causing a sudden – and irreversible – loss of mountain soils. Natural factors contributing to soil movement, such as seismicity and intense rainfall, are aggravated by human factors such as deforestation, overgrazing, the extension of agriculture onto steep slopes, and open-cast mining and road construction without regard for environmental and geological factors. Mountain forests have a key protective role in that their roots hold the soil together,

reducing the risk of landslides and erosion. Well-maintained agricultural terraces can also contribute to preventing soil erosion.

Development in both the lowlands and highlands can bring about different kinds of hazards. Air pollution from industrial and urban centres in the plains can be a major threat to mountain environments. The vertical dimension of mountain environments means they intercept such air pollution and this air can become trapped in valleys and depressions. Impacts include the devastation of mountain forests by acid rain – the atmospheric pollution largely resulting from the burning of fossil fuels.

Turning the snow black

Even for those in developed economies with access to sophisticated transport systems, there is, increasingly, a price to pay. In the Swiss Alps, for example, serious traffic congestion and air pollution are issues of major concern for local populations.

In the last 25 years, transalpine freight traffic has more than tripled, bringing with it record air pollution problems. To make matters worse, freight lorries tend to concentrate on just a small number of the Alpine passes and the resulting air pollution from their exhaust fumes can exceed legal limits over large regions of the Alps.⁷² In 1998, over 160 million tons of goods crossed the Alps, two-thirds by road. A study for the European Union shows that by the year 2010 there will be a 75 per cent increase in this figure.⁷³



Mark Edwards/Still Pictures

Alpine traffic – because of the altitude, pollution is three times worse in mountain areas than it is in the lowlands.

Air pollution is transboundary in nature and so can only be addressed through intergovernmental cooperation. Through the Alpine Convention, the environment ministers of seven Alpine countries have committed themselves to shifting as much freight as possible from roads to railways and thus promoting the railway infrastructure rather than building new transit roads.

In East Asia, environmental experts predict that by 2020 sulphur dioxide emissions in East Asia will triple the 1990 level (amounting to 75 million tons) if present energy and environmental policies remain unchanged. Asian environmental groups met in Beijing in February 2002 to raise awareness of the increasing problem of acid rain in the region.⁷⁴

Climate change

Most – but not all – agree that climate change is a result of global warming caused by greenhouse gases (mainly carbon dioxide, methane and nitrous oxide). Emissions of carbon dioxide have multiplied 12 times between 1900 and 2000.⁷⁵

Climate change has significant implications for mountain societies as well as populations living downstream, though the Mountain Agenda (1997) says that “detailed predictions of future mountain climates are difficult, due to the complexity of mountain regions and insufficient long-term data”.⁷⁶

Higher temperatures may increase agricultural and forestry production and less snow may ease transportation problems. However, weeds, pests and diseases may prosper and fires may increase. As temperatures rise it seems likely that mountain organisms will be able to live at higher altitudes.⁷⁷ Yet “species already confined to the tops of mountains or below impassable barriers like rock outcroppings or highways could be exterminated as they are ecologically squeezed out of their habitat”.⁷⁸

Mountain ecosystems may be especially vulnerable to disruption because although they contain very diverse species of plant and wildlife, within a single zone biodiversity may be small, and the potential to recover quite limited.

The most dramatic results of climate change in mountain environments will be the predicted increase in the frequency of extreme events such as floods, avalanches and landslides, and the potential reduction in the world’s fresh water supplies.

Mountains are referred to as early warning systems of global warming, with the increased melting (and shrinking) of glaciers throughout most mountain ranges in this century providing tangible evidence of climate change. While the melting of glaciers

might provide greater water flow in the short term, in the long term it will have the opposite effect. With millions of people around the world dependent on fresh water supplied by mountain watersheds, global warming/climate change is more than an imminent threat to island nations facing raising sea-levels; it is a threat to all.

Taking the shine off Mount Kilimanjaro

Mount Kilimanjaro in Tanzania has lost a third of its ice fields in the last 20 years and, according to US scientist Lonnie Thompson, the rest of its ice could disappear by 2015. He added that other tropical peaks have shown the same trend.

Kilimanjaro is Africa's tallest mountain. It is also Tanzania's top visitor attraction, with some 20,000 tourists a year. The melting of the ice fields will affect the drinking water supply, agriculture and hydroelectric production.⁷⁹ Over one million villagers live at the foot of the mountain and depend on its springs for drinking water and to irrigate their farms.

Eric Mgurusi, director of environment in the Vice President's Office, says: "In Tanzania, deforestation and farming activities contribute to the building up of the heat-trapping gases and in the process are warming up the atmosphere."

He blames the use of fertilisers – which break down into methane and nitrous oxide – and bush fires which are used by farmers to clear land and honey collectors to chase away bees.

Data shows that 17,629 hectares of natural forests on Mount Kilimanjaro were destroyed by fires in the last seven years.

While the government is quick to state that they disagree with Thompson's findings, saying that they were "not comprehensive", people such as Frank Kalimba of the Tanzania Environment Association say: "The melting of the ice is a real threat and the government must wake up and do something about it." Meanwhile, residents around the mountain have taken action and formed their own groups to help alleviate the effects of any melting ice urging people to stop cutting trees or starting bush fires.

Alfred Mbogora, *Gemini News Service*⁸⁰

Tanzania is not the only country facing this issue. It is predicted that up to a quarter of the global mountain glaciers could disappear by 2050 and up to half by 2100.⁸¹ In addition to affecting water

supply, the melting of glaciers is also leading to the formation of glacial lakes in some mountain regions. There is a real danger that these will lead to sudden discharges of huge volumes of water and debris. These glacial lake outburst floods can cause catastrophic flooding downstream. Within Asia alone, these massive floods have happened in recent years in Bhutan, China, India, Nepal and Pakistan. Ongoing survey work by the International Centre for Integrated Mountain Development (ICIMOD) and UNEP has revealed 3,252 glaciers and 2,323 glacial lakes in Nepal, and 677 glaciers and 2,674 glacial lakes in Bhutan.⁸² Within the area surveyed, researchers state that 20 of the glacial lakes in Nepal and 24 in Bhutan have become potentially dangerous due to rising temperatures. Yet there may be many other potential glacial floods in the Hindu Kush/Himalayan region and elsewhere in the world which are in a similar critical state. Future surveys are planned for China, Pakistan and Central Asia.⁸³

Conflict

The worst disasters in mountain regions – when measured by casualties, displacement and economic or habitat devastation – have been brought about by armed conflict. In 1999, 23 of the world's 27 major conflicts were in mountain areas.⁸⁴

Conflict has played an invidious role in many mountain communities' lives. Remoteness and poor communications have meant that mountain people have at times been massacred far from the attention of the media or human rights activists. Whether international or 'internal' conflicts, such as, for example, the Sudanese state's campaign against the Nuba in the mountains of southern Sudan, mountain areas tend to be the backdrop for most of the main conflicts currently raging around the world – from Afghanistan to Chechnya, and from Kashmir to Colombia.

This is not a new phenomenon; there have been over 100 wars and conflicts between 1945 and 1995 in mountain regions, resulting in 11.1 million casualties, including 7.8 million civilians.⁸⁵ Many mountain conflicts have been going on for years; the longest-running armed conflict in the world, other than the Israeli-Palestinian struggle, is on the Himalayan Siachen Glacier, where India and Pakistan have been in conflict for 54 years.⁸⁶

So why should conflict be such a feature of mountain environments? One reason is that occupying the high ground has always been of strategic importance; the rugged high terrain offers military advantage. And mountain areas are frequently borders (whether disputed or otherwise) between different states. Further,



In the shadow of the mountain – unexploded bombs lie next to a farmer's fields in Kurdish Iraq.

many minority and indigenous peoples who live in mountain areas are politically marginalised in terms of national representation, especially migratory populations. Governments fearing secession may respond with heavy-handed tactics.

There are several other reasons for conflict in mountain areas.⁸⁷ These include poverty, which can give rise to radical or extremist political groups, who may receive funding from abroad. In 1995, the inability to manage mountain waters (see water section) has given rise to 14 international conflicts.⁸⁸ In addition, poverty-stricken communities may start to grow drugs, which are far more lucrative than other crops, but put them in touch with criminal organisations and thus at odds with government.

Drugs and development

The raw plant materials for cocaine and heroin come from a few mountain areas: opium is grown in several mountainous areas of Asia including Laos and Afghanistan; coca is grown in the equatorial Andes. Mountain farmers in these regions have grown these crops for centuries and increasingly depend on them in the absence of any viable alternative. Where the state has failed to provide transport,

access to markets and other facilities, the only way to survive may be to work with narcotics entrepreneurs who provide a cash crop with accompanying infrastructure. In this way they become part of a huge, profitable international industry characterised by violence and social instability. Suppression and eradication have had limited success and the rapid destruction of these crops by national and international agencies can have disastrous consequences for mountain farmers and habitats. While crop substitution is increasingly promoted, unless it is part of a wider development programme, in which viable economic alternatives are developed with the participation of the growers, mountain communities remain vulnerable to the narcotics business.⁸⁹

The aftermath

Apart from the immediate and obvious impacts of armed conflict, mountain peoples are often forced to flee to lowland or other unfamiliar territories with no immediate means of making a living. Large numbers of refugees fleeing conflicts today are from mountain areas.

Environmental degradation and social/economic upheaval also accompany conflicts, making mountain communities' eventual return to a former conflict area, and their ability to live from the land, extremely difficult. Water sources may have become polluted, areas mined or strewn with unexploded bombs (as in parts of Afghanistan, former Yugoslavia and Kashmir) and already scarce roads and other forms of communications destroyed, threatening food and medical supplies and disrupting education and any remaining economic activity. The death, injuries and emotional trauma of war destroy individual lives as well as local and national development. The widespread devastation in such highland communities is illustrated by the fact that the UN figures show that 11 out of 18 of the world's regions most in need of humanitarian assistance and food aid are mountainous.⁹⁰

Development in mountain communities is difficult while battles are raging. Jacques Diouf, Director-General of the UN Food and Agriculture Organisation says, "As we begin commemorating the International Year of Mountains, conflict may be the single greatest obstacle to achieving our goals. Without peace, we cannot reduce poverty. Without peace, we cannot ensure secure food supplies. Without peace, we cannot even consider sustainable development."⁹¹

Achieving a balance?

4 Forests and water

A quarter of the world's forests and the sources of the world's major rivers are in mountain regions. Mountain communities have been blamed for deforestation, yet the largest demand for resources comes from elsewhere. Lowland extraction of timber, water and minerals is on a far larger scale than any local use, and it is scale that can make the difference between sustainable and unsustainable extraction.

Jack Ives, a specialist adviser on mountain ecosystems to the United Nations University, says: "Logging, both illegal and government-sponsored, dam construction in areas of high seismic activity, and inappropriate reforestation programs are responsible for far more damage than that caused by so-called 'ignorant' subsistence mountain farmers."⁹²

Forests as livelihood

"Our entire life depends on forests. We get firewood from forests, wood for house construction, and also fodder for our cattle... We also get grass, leaves, precious herbs and minerals for our animals. In addition, forests give us tea leaves, humus, fertiliser..." says Lakupati, a tribal woman aged 80, from Kinnaur, India.⁹³

Forests are much more than just a source of timber: they help mountains 'trap' the moisture from the atmosphere, providing valuable water supplies, particularly when rainfall is scarce. They also contain an abundance of animal, bird and plant species and typically have higher biodiversity per unit area than adjacent lowland forests. In sum, they have three key functions:

- Productive – providing timber, fuel, as well as non-wood products such as medicinal plants, fungi, humus, and animals.
- Protective – including watershed and biodiversity protection, hazard prevention, and ecosystem regulation.
- Cultural and recreational – safeguarding cultural and spiritual values, and as areas for recreation and education.

"While production of timber is the most widely accepted function of mountain forests, security is often the most important service they provide – whether this relates to reliable supplies of water or food, or to the protection of settlements and infrastructure against hazards."⁹⁴

The emphasis on production rather than protection tends to be to mountain people's disadvantage, since they will be the first to be affected by insecurity of food and water supplies, and by increasing soil erosion, landslips, mudslides and avalanches. In the long term, such erosion of forests' protective qualities affects populations lower down.

"Without protective forests, many mountain areas would not only become uninhabitable, but also too dangerous as traffic and transit corridors."⁹⁵

Many roles for mountain forests

- In the US, recreation and tourism accounts for 74.8 per cent, or \$91 billion, of the Forest Service's income from national forests – many of them in mountains. Timber sales provide only 2.7 per cent of the income.
- In Laos, state-controlled sales of wood products is the single most important source of foreign exchange, contributing over 30 per cent in 1993. Most of the country's forests are in mountain areas and are managed by slash-and-burn communities, who have come under increasing pressure from the timber industry.
- In Switzerland, the main aim of mountain forests is to provide public security against natural hazards such as avalanches. The value of protection provided by these forests has been estimated at \$3 to 4 billion per year.⁹⁶

In some areas, the rich biodiversity of mountain forests has decreased as a result of large-scale logging followed by plantations of fast-growing species, such as pine, which may provide wood for industry but at the expense of other forest products. Misguided reforestation programmes have exacerbated water loss and soil deterioration and failed to replace lost biodiversity. Mixed forests of different species and ages are also more resilient to natural hazards than monoculture plantations.

Jagat, a self-taught forester in Garhwal, who is single-handedly planting and experimenting with restoring mixed forests, says: "Earlier there were dense forests and there were many species. But now in the monoculture pine forests, there is no diversity".⁹⁷

Natural mixed forests can provide people with a range of non-timber products such as herbs, mushrooms and aromatics. In addition to being valuable for local use, local people are increasingly finding markets for such products.

Mountain societies have a vested interest in maintaining forests that they use. And with that use comes specialist knowledge, passed on from generation to generation. In the Garhwal region of India, for example, local women were able to identify 145 species of plants that had been destroyed by commercial logging and mining, whereas national foresters could only identify 25.⁹⁸

There is a complex mixture of private, communal and state ownership of forests in many mountain regions. In many countries, state control has made it easier for large-scale logging to take place. It is now increasingly recognised that making mountain communities the custodians of their surrounding forests is a better policy for protecting forests than state ownership. This is nothing new; historically communities have managed their forest and pasture land and often had cooperative institutions for doing so.

Jagat, from India, explains how local people have become detached from what was once one of their greatest resources:

“People had a deep feeling for the forest... they got their vegetables, medicines, as well as grass, fuel and so on from the forest. If there was [a forest fire] everybody went in a group to put it out. Today it is just the opposite... people are indifferent because nothing which belongs to them is burning, it is the forest department’s.”⁹⁹

FUGs in Nepal

Nepal’s people have always used forests for their basic needs but as the population grew, pressure on resources increased. In 1957 the forests were nationalised, with the idea that government management would regulate the use of forest resources by local people.

But the policy had the opposite effect, as disenfranchised users felt free to over-exploit the forest resources, leading to rapid deforestation. Realising this, the government started to involve local communities and in 1978 Community Forestry regulations were formulated. But it was the 1993 Forest Act that was most significant in directing forest management back to communities with its recognition of Forest User Groups (FUGs). FUGs have the right to harvest timber from their managed areas and receive all income generated from resources of the Community Forests.¹⁰⁰

Water towers of the world

All the major rivers in the world have their headwaters in mountains, including the Amazon, the Nile, the Indus and the

Yangtze, and more than half of the world's population relies on the fresh water that accumulates in mountains.

The year 2003 has been designated as the International Year of Fresh Water and aims to increase awareness of the importance of sustainable freshwater use, management and protection.

Already about one billion people do not have an assured supply of good quality water. Chronic water scarcity is predicted to affect three billion people in 52 countries by 2025,¹⁰¹ and there is genuine concern that major conflicts could develop over water.

As lowland water sources become more depleted and polluted, the pressure on supplies from mountain systems is increasing. At the same time, water supplies from mountains are becoming less reliable and predictable as a result of changing land-use patterns, diversion systems, dams, and climate change.

“As freshwater demands increase, freshwater resources must be carefully managed, starting at the source, in the mountain regions themselves.”¹⁰²

But current research does not always focus on mountain water resources: 75 per cent of all stream-flow monitoring is focused on lowland waters (less than 500 m above sea level).¹⁰³

Mountain forests are essential providers of water. The cloud forests of La Tigra National Park in Honduras provide more than 40 per cent of the year-round water supply to the 850,000 people of the capital city, Tegucigalpa.¹⁰⁴ The entire population of California, US, depends on mountain water. In La Paz and El Alto in Bolivia, 1.4 billion people depend mostly on water from surrounding mountain glaciers, and hydropower plants on the eastern side of the Andes generate 75 per cent of the area's electricity.¹⁰⁵ In China, Southeast Asia, and South Asia, three billion people are dependent on the water towers of the Tibetan plateau.¹⁰⁶

Water wars

If highland water resources are not fairly and sustainably managed, this can put an intolerable strain on relations between highland and lowland communities.

The mountainous regions of Africa are characterised by their fertile and rich soils; agricultural intensification in these regions has a serious impact on lowlanders' water supplies. For example, two million people rely on Mount Kenya's water supplies. In recent years farmers in the highlands around Mount Kenya have been using more and more water for crop irrigation. This has significantly reduced downstream water flow, having a negative

impact on those whose survival depends on lowland pastures, cattle ranching and tourism in wildlife parks.

Equally, over-development downstream may create unsustainable demands on mountain water sources. The Aral Sea basin of Central Asia, now shrunk to half its 1960 size, is acknowledged to be an ecological disaster, resulting from human-induced changes to the water cycle in the lowlands without adequate consideration of the impacts. Water problems are a serious threat to stability in the region; many experts believe that tensions could partly be resolved if water was used more efficiently.¹⁰⁷

There are examples of effective international cooperation; India and Pakistan continue to respect the treaty that governs their shared use of the Indus, for example. But water remains a potential cause of conflict, as a recent report warned: “Where politically strained relationships already exist, downstream states often fear that their upstream neighbours might use control over the water as a means of coercion.”¹⁰⁸

Hydropower

In addition to supplying water for drinking, domestic use, irrigation, industry and transport, water stored in mountain lakes and reservoirs is a potential source of hydroelectric power for an increasingly urbanised and industrialised world.

For some mountainous regions, water – and its hydroelectric potential – is the only marketable resource. Lesotho, the only country in the world with all its territory above 1,000 metres, is also one of the poorest. But its mountains form Southern Africa’s most important watershed and have become the site of the billion-dollar Lesotho Highlands Water Project, which diverts water from the country’s Senqu/Orange river, via tunnels and dams, to South Africa’s industrial heartland. Lesotho earns royalties from the sale of its water and some hydroelectric power.

Lesotho, entirely surrounded by the richer and more powerful South Africa, was hardly in a position to strike a hard bargain. Some of the villagers resettled as a result of the Project are still living without electricity and have had to exchange land – a permanent resource – for a compensation payment, which, as they put it: “just goes out and ...nothing comes back in”. Losing their land meant not only the loss of their self-sufficiency, but also rendered useless their “wisdom of living in that place” – the accumulated knowledge of the mountainous fields and vegetation.¹⁰⁹

Other communities are in a better position to demand a fair price for the extraction of mountain resources. In the late 1990s the

Swiss canton of Grisons produced 7,500 Giga watts per hour (GWh) of hydroelectricity a year. Of this 1,680 GWh (23 per cent) was used locally; the rest – over three-quarters – was exported downstream. The Grisons canton earned US\$75 million from the sale of this energy.¹¹⁰

Alternative sources of energy

As people's main source of energy – fuel wood – becomes harder to rely on, there is a need to identify alternative sources of energy in mountain regions. Solar power, wind power and biogas all require high initial investment and maintenance making them unfeasible in the near future for the majority of mountain people, especially in developing countries. Small-scale hydropower, based upon watermills, has been more successful in providing an additional source of energy.

For example, the Daga-speaking people of Milne Bay Province in Papua New Guinea live in a remote region in the Owen Stanley Ranges. There is no road access and few services and facilities. The several hundred villagers in the area have little opportunity for cash income. However, the development of a small hydroelectric facility in

Jon Levy/Panos Pictures



Karakaya Dam, Turkey – while most dams are in the mountains, most of the services they provide – flood control, irrigation, electricity – are used in the more densely populated plains and urban areas.

the 1990s is now bringing positive change. In addition to providing lighting and power for radio sets, it also supplies electricity for an oven that dries cardamom seeds for export, and at times villagers sell surplus energy to the nearest government power station. The system is now fully operated and maintained by the community.¹¹¹

Decentralised power in the Himalaya

“Large power stations capable of generating hundreds and thousands of megawatts are vital for the economy of a nation. But the electricity generated at big stations, distributed by vast national grids, rarely reaches remote villages. The cost of extending the network to reach these areas is not economically justified by the low demand. Consequently, villages must look to other alternatives. Tiny hydroelectric turbines that produce no more than a few kilowatts – micro hydro plants – are becoming popular in the villages across the Himalaya. Mini hydro plants are slightly larger: their output is in the hundreds of kilowatts...

Besides their low cost, the main attraction of these small turbines is that it is possible to generate power close to points where it is needed. Small hydropower plants are pro-environment, pro-poor, and pro-village; qualities that, according to critics, are missing in big dams. In the tiny mountain villages of predominately rural Nepal... there are nearly 1,000 micro turbines.

During the day these turbines work like traditional water mills, grinding grain and extracting oil. During darkness the machines switch into generation mode and light up electric bulbs throughout the villages.

While barely one per cent of the micro/mini hydroelectric potential has been tapped in the Himalaya, China has developed a fifth of the potential in its rivers and has more than 45,000 micro/mini hydro plants...¹¹²

Bhim Subba

Profits for protection

By protecting and managing forests and water sources, mountain communities provide short- and long-term security benefits for themselves and for downstream populations. Some governments have recognised this and are financially compensating them for the provision of this vital environmental service.

Recognising and financing the role of mountain people as stewards of vital global assets such as forests and water could reduce poverty levels, as well as ensure the sustainable management and conservation of natural resources.

Forest innovations in Costa Rica

Costa Rica's mountain forests contribute to the generation of about a third of the country's electricity and almost half of its drinking water. These forests also shelter many species of flora and fauna that attract thousands of tourists each year. One of the most important innovations of Costa Rica's 1996 Forestry Law was the decision to compensate forest owners for the environmental services their forests provide to society, namely:

- Uptake of greenhouse gases from the atmosphere
- Biodiversity protection
- Watershed protection
- Protection of natural scenic beauty

The system is supported by a tax on fossil fuels. New proposals have been put forward for financing it by including the cost of watershed management in the cost of hydroelectricity and drinking water supply. In 1997 \$14 million was paid out for environmental services, which resulted in the reforestation of 6,500 hectares, the sustainable management of 10,000 hectares of natural forests, and the preservation of 79,000 hectares of private natural forests. 80 per cent of this funding originated nationally; the rest was generated by the international sale of carbon fixation services under the 'Clean Development Mechanism' of the Kyoto climate change agreement.¹¹³

The first challenge is to value mountain resources. New environmental economic tools are being developed to place monetary values on traditionally unmeasurable 'public' goods such as water, biodiversity, and forests. This requires an extensive evaluation of the environmental services and other conservation benefits that mountain areas provide for lowland and urban areas.¹¹⁴

The value should take account of the full benefits of the resource downstream; the costs incurred upstream for maintenance; and the potential costs of over-exploitation or damage by upstream users.¹¹⁵

Once such values for environmental services and natural resources have been identified, and the legal rights of mountain communities secured, mechanisms can be employed to capture this value. It can then be redirected from downstream users to highland communities so that "those sharing in the benefits of mountain resources also share in the responsibility for their sustainability."¹¹⁶

5 Mining and tourism

In many mountain regions the nature of the terrain, difficulties of access, and high transport costs restrict the development of industry and business, and local possibilities for waged employment.

Mining and tourism are two industries for which certain mountain environments are a positive attraction: mining companies want to explore the mineral deposits; tourists look to mountains for recreation. Any cost disadvantages due to the locations are overridden by the unique nature of mountain resources.

Both industries have had significant effects on mountain societies in recent decades, and despite their very different characteristics, they share some attributes. Both have a tendency to “erode their capital” (literally, in the case of mining) and move on, and usually have significant social and environmental impacts on the landscapes where they are based. In the short term they provide much-needed local cash income – albeit mainly for casual labour – and an alternative to migrating elsewhere for work. However, they rarely invest outside their primary interest or develop related sectors with long-term potential, for example, manufacturing or processing in mining, or the promoting of local products in tourism.

Mining – a mixed blessing

The same natural forces that created mountains helped to concentrate mineral deposits; many mountain ranges, such as the two great chains of the Andes, are rich in metals and minerals. While mining as a means to profit from the land has a long history, it has proved to be a mixed blessing for the communities who live in mining areas.

Small-scale mining has existed for centuries, but more recently the industry’s increasingly large-scale operations have sometimes had dramatic and destructive impacts on mountain landscapes. Mining companies can bring employment, business and training opportunities and infrastructure. But the environment may pay a high price:

“Environmental impacts include habitat destruction, increased erosion, air pollution, acid drainage, and metal contamination of water bodies.”¹¹⁷

The next two case studies, both from Latin America, look at the relationship between mining and community interests. The first examines the impact of large-scale mining in Peru's Central Andes, where the long-term environmental damage has changed the physical and social landscape. The second describes the successful resistance of one community to a mining development.

A mountain of rubbish

"The hillsides of the mountain range were pure pasture so we were able to keep cattle and also plant crops... But if you look around now... there's no land to be seen – there's a mountain there, but it's a mountain of pure rubbish from the mine," says Ignacio, aged 71, from Huaranccacca, Cerro de Pasco.

At 6,000 metres, Cerro de Pasco hosts one of the highest mines in the world. Mining in this part of the Peruvian Central Andes has a long history, with evidence of activity by the Incas and the Spanish conquistadores, but it was not until the latter part of the 19th century that it started to become a major industry.

In recent years this has become increasingly privatised and mechanised. Mining jobs are becoming scarcer. But the long-term legacy remains. Waste from the mines seeped into the water supply, and polluted the springs that run through the pastures; lakes once famous for fish and birdlife are discoloured and empty and their surroundings silent. Fumes from the smelter and other processing plants polluted the air and destroyed vegetation. The health of people and livestock has been badly affected; few farmers now make a living from herding alone.

Local people who took mining jobs faced a conflict of interests; they were dependent for their salary on an industry which they knew was polluting the surrounding environment, and so reducing the viability of local agriculture.

The youth of Cerro de Pasco are now spared this dilemma: "Very few young people work in the [mining] company these days and those that do are casual workers..." says Carmen, an 18-year-old student.

But as people move elsewhere for work and the communities shrink, so do the options for trade and employment. "The young people don't stay... the countryside's depopulated and the cities grow. If I wanted to set up a small business, there's no one to

buy from me because you can count the population on your fingers. So the future's in other places..." says Juan, aged 23.

One of the fundamental problems, local people point out, is that there has never been any attempt to support manufacturing or processing: the region is seen solely as a producer of raw materials.

"Here in Cerro de Pasco, they don't even make nails. So what happens? There are no jobs because they don't develop industries here to create jobs," says Juan. Local people are campaigning for improved environmental and working practices, but above all to ensure that the mineral wealth starts to benefit those living in the mountains.

"The smelter has produced hundreds of thousands of millions of dollars. They have taken the gold, the silver, but there hasn't been equitable appropriate social development... Mining is important, it is something that nature gave the central region... But mining should not only enrich a few, it should benefit everyone, especially the people from the regions, their communities," says Amador, a carpenter aged 51.¹¹⁸

What has happened in Cerro de Pasco has lessons for other highlanders, as the industry plays an increasingly important role in the Peruvian economy. In 1992 it occupied four million hectares in Peru; by 2000 this was 15 million hectares. This is almost 13 per cent of the entire country. More than half of Peru's indigenous communities are found in areas influenced by mining. And although mining companies have become more environmentally responsible, their impact on the land will always be significant.



Cooperación

A community protest against the mining industry's contamination of the environment, Cerro de Pasco.

From copper to coffee: an anti-mining campaign

The Intag area of the Toisan range of mountains in northwest Ecuador is home to many thousands of rare plants, birds and animals, including orchids, hummingbirds, and jaguars. In the early 1990s it came under threat from an agreement between the Ecuadorian and Japanese governments for a major mining concession for Mitsubishi.

The 15,000-strong Intag community has no main ethnic or cultural identity – it is made up mainly of settlers to the region – and has little formal education or financial resources. In 1995 Carlos Zorrilla Casilla, one of the country's leading environmentalists, successfully developed an environmental group made up wholly of local people: Defensa y Conservacion Ecologia de Intag (DECOIN).

DECOIN obtained a copy of the company's environmental impact study. It showed extremely worrying assessments including: massive deforestation; dangerous levels of contamination of rivers; the relocation of 100 families; local climactic change leading to desertification; and threats to several endangered species.

The group acted quickly, holding meetings and spreading the news via the Internet to international campaign groups, which generated mainstream media coverage and a stream of letters from Europe and the US to the Ecuadorian government and Mitsubishi officials.

DECOIN tried, unsuccessfully, to engage government officials to find a peaceful and sustainable solution to the mining and environmental issues. By 1997, it decided that the only option was to burn down the mining camp. It did this after carefully removing all equipment and handing it over to mining officials.

DECOIN's act stopped all mining activities in the area and led to the suspension of the Ecuadorian-Japanese agreement on the mining project.

Carlos adds: "It showed the communities that by being organised they can successfully defend their environment and their basic human rights, even against such powerful players as the government and a giant multinational corporation."

Resisting the mining was not enough; the community was determined to find alternative livelihoods and formed an organic

coffee-growers association. This later received help from a Japanese fair trade organisation and now the Intag are exporting coffee to Japan. The community is also promoting ecological tourism, native tree reforestation, small gardens and handicraft projects.

In case the price of copper rises and the Ecuadorian government decides to offer the mining concession to another company, DECOIN has published a book for policymakers on the ecological impacts of mining in Ecuador.¹¹⁹

Tourism – the world’s largest industry

Another source of employment and income for highlanders is tourism, often cited as the world’s largest industry. Mountain tourism accounts for 15 to 20 per cent of this industry – \$70–90 billion a year.¹²⁰ Tourists are drawn to mountains for their unique landscapes, clean cool air, recreational opportunities, cultural diversity, and sacred sites. Yet the industry has a tendency to destroy its own foundations.

“Tourism relies on natural and cultural capital which highlights the importance of protecting the resource base on which the industry depends.”¹²¹ There are many examples where the industry’s success has eroded this ‘capital’, for example in parts of the Alps, which have become so overbuilt and over-settled that they are losing their attraction for tourists.

Similarly, indigenous inhabitants and their cultures are an important part of the travel experience for many tourists, many perceiving mountain peoples as relatively ‘untouched’ by modern life. The increase in road construction, along with developments in air travel, has made mountain areas that were previously difficult to reach easily accessible. So ‘modern life’ is now being brought to mountain peoples by the very business seeking to sell it.

However, in mountain areas that have witnessed significant depopulation during the last 50 years, tourism is a way of bringing these places back to life.

Krzysztof Komornicki, head of a local non-governmental organisation, describes some of the changes in the Sudety Mountains of southwest Poland: “When I first came here, the process of depopulation was in progress. There are some villages that have remained only names on the map... At the moment, we are experiencing the opposite phenomenon. There are people coming here... They often try their luck in agritourism.”

“That is a totally new phenomenon and a positive change. The mountains will stop being depopulated. I think they will belong to the people again, but this time it will be more sensible, better planned, taking into account the requirements of a harmony between economic needs and preserving certain basic principles related to the environment and its needs.”¹²²

Not all mountain areas have tourism potential. Where it does exist, however, it can have a major impact, and it is a growing industry, which by its very nature constantly strives to find new destinations. Tourism is highly selective in the benefits it distributes: some locations and peoples benefit disproportionately, leaving others still at subsistence level. Tourism activity in northern Pakistan, for example, has been highly spatially concentrated: it is estimated that 90 per cent of the tourism is in four main towns and 20 additional villages.¹²³

Within locations, these benefits are far from equally distributed between different stakeholders. After foreign companies and national governments have taken their cut, the few remaining profits end up in the hands of a small number of local entrepreneurs: those with money to invest in local guiding companies, hotels, shops or restaurants. The options for people without such investment potential may be more menial jobs, such as portering for trekkers or mountaineers. Although a much-needed source of cash, this is a risky and insecure occupation. Tourism Concern, a British non-governmental organisation working on issues of sustainable tourism, is currently running a campaign for fairer conditions for mountain porters.¹²⁴

New regulations introduced in 2001 in Machu Picchu, Peru, have placed weight limits on the loads porters can carry and only licensed operators can organise tours. But porters feel there is still much to be done. In their own words, “We are victims of manipulation; of being contracted as ‘beasts of burden’. If we protest, we simply won’t be re-contracted: we don’t have any other employment options... The aggressive behaviour shown to us as porters goes against our most basic rights to work, to dignity and as citizens.”¹²⁵

Another dilemma for mountain households who depend on their land and livestock as well as off-farm income is that the times of year best suited to traditional economic activities – agriculture and livestock care – are often those which are most attractive to tourists. In parts of Nepal, India and Pakistan, many men work as porters and guides during trekking/climbing seasons, leaving the agricultural work for their female relatives or even hired help,

which in some cases may force the abandonment of certain farming practices.

Finally, tourism trends are not only highly seasonal, they are volatile and sensitive to bad press and security concerns. Popular destinations such as Kashmir, Ladakh, parts of Latin America and more recently Nepal, all face intermittent or more permanent drops in tourist numbers as a result of conflicts and the media coverage of those conflicts.

Spiritual tourism

Religious pilgrimage is the oldest form of tourism in mountain areas. Many mountains contain sites of great spiritual significance or are themselves holy places for different religions, for example, Mount Sinai in Egypt; Mount Kailas in Tibet; and Mount Fuji in Japan. Greater numbers of pilgrims visit the Himalaya each year than do 'ordinary' tourists. Badrinath, one of the major pilgrim sites in the Indian Himalaya, is currently visited by 450,000 people a year, a threefold increase over two decades.¹²⁶

No peace for China's sacred mountains

China has scores of sacred mountains. For centuries these have been visited by Buddhist or Taoist pilgrims. In more recent times, however, the number of people wishing to visit the shrines and temples has become unsustainable.

In traditional Chinese society, sacred mountains were places of retreat from the everyday world – for people to study religious philosophy, and to be at one with nature. Previously, they were owned and run by large monasteries; they also offered a place of refuge to wildlife, following sustainable systems of agriculture and forestry. Today this harmonious balance is in danger. Now that the mountain land no longer belongs to the monasteries, hunting, logging, tourism and the accompanying pollution have been taking their toll. Many visitors are no longer content to make an arduous ascent, and are calling for cable cars and increased ease of access. With this comes big business, construction work and developers, working to an altogether different ethos. The Taoists of China have issued their first statement on the need for ecology in their 2000-year history, stating: "Taoism has a unique sense of value in that it judges affluence by the number of different species."¹²⁷

Ecotourism and conservation

While some see tourism as the route to economic development, more recently it has also been seen as a tool for conservation – in the guise of ecotourism. Given that half the world’s protected areas are in mountains, the potential for ecotourism development is significant.

National parks in mountain regions are often promoted as conservation schemes, protecting wildlife and attracting tourists. A reserve in the Sikhote-Alin range in Russia is currently being established over 15,000 square kilometres. The plan is to encourage tourism and also to further conservation efforts – particularly to protect 50 Amur tigers. It will be one of the world’s largest wildlife reserves.¹²⁸

2002 is the International Year of Ecotourism¹²⁹ and there is likely to be considerable debate on its merits and demerits. One of the problems is that there are no internationally recognised standards and definitions, and many agencies are using the label of ecotourism to promote their products.

One area where ecotourism is being developed is the Sierra Norte of Mexico. Laura is one of the young guides who have been trained with support from Mexico’s World Wildlife Fund. She explains: “I think ecotourism is a way to bring money into the community... and, maybe, at the same time to protect our own mountain... to sell the mountain but in a different way, not exploiting it, or cutting down trees... if the project works, it might generate more jobs, maybe those people who used to fell trees will take up something else without damaging the environment.”¹³⁰

However, disillusionment with ecotourism is spreading, especially among groups that support the rights of indigenous peoples. The Rethinking Tourism Project is concerned that larger nature conservation and development organisations might not always respect local people’s rights.¹³¹ Tourism Concern argue that promoting ecotourism, “by its nature, necessitates developing tourism in fragile, sensitive areas”.¹³²

Certainly, conflict can sometimes develop between local people’s needs and culture, and national priorities. The development of eco-parks in the hills of Bangladesh in the name of tourism and biodiversity conservation will involve clearance of forested land and the displacement of many *adivasis* (tribal people). A large movement has developed in Bangladesh opposed to these eco-parks for environmental reasons and concern about human rights.

Tourism in Mount Elgon, which straddles the border of Uganda and Kenya and is home to several ethnic groups, is relatively new. One of

the immediate impacts of the drive to attract tourists was the creation of a conservation scheme and a national park, causing a number of mountain communities to be resettled in 1983 and 1990. They are now restricted from entering the park or gaining access to the mountain's peaks, which have deep spiritual significance for them. While many local people appreciated the need for conservation and the link with sustainable tourism, having to pay for access to their most important spiritual sites has caused much distress.¹³³

“Less is more”: approaches to tourism

There are hard choices to make between encouraging greater tourist numbers and increasing income; and limiting the numbers and thereby potential negative impacts. Two neighbouring countries have taken opposite approaches.

Bhutan is rich in biodiversity. In order to safeguard the country's environment and culture, the government has developed a policy of “low volume, high value tourism”. In 2001, 6,393 tourists entered Bhutan.¹³⁴ Restricting the numbers helps to regulate the impact of tourism in a country with limited infrastructure, while imposing a daily tariff (approximately \$200 per day¹³⁵) to cover the costs of a pre-planned tour ensuring reasonably high economic returns.¹³⁶

Nepal is one of the world's poorest countries. Its government has viewed tourism as a growth industry. It recently announced the opening up of an additional 103 mountain peaks for international



Nigel Dickinson/Still Pictures

Face to face – tourists and local people in Egypt; for 83 per cent of countries, tourism is one of the top five sources of foreign exchange. Mountain tourism accounts for 15–20 per cent of the industry.

climbing, bringing the total to 263.¹³⁷ While many business interests welcomed this initiative, some people do not. Gopi K Sedhain of Nepal's Pro Public group says that this is just the latest example of "irresponsible behaviour" by the government regarding Nepal's "already over-exploited mountain resources". He adds: "...a handful of trekking and tour operators in Kathmandu and Pokhara and lodge owners of the trekking areas have been making a good earning at the cost of the environment and poverty of mountain people."¹³⁸

While some continue to see tourism as a tool for development, others are more sceptical. Laurence Moss, a consultant on issues of change in mountain ecologies, warns that for a community or mountain region "to rely on tourism as an important source of conservation (of environment and culture) and development (read principally, greater income) it must become very skilled at understanding, then manipulating, particularly these external powers". Moreover, for tourism to be managed and planned by mountain communities, local people need to acquire the skills to successfully compete against outside agencies, and to take advantage of the opportunities tourism offers.¹³⁹

If mining and tourism are to benefit mountain societies, then issues of scale and sustainability are paramount. Local people must have a role in planning and decision-making, and the industries need to consider the long-term benefit for the area as well as more immediate profits.

There is a compelling argument that the strategy should be diversification of mountain economies rather than reliance on any one sector. Mountain livelihoods are traditionally characterised by their use of a wide range of resources. Families in developing economies may combine subsistence farming with some cash crop production; utilise commonly managed grazing land and irrigation networks; collect forest products for use and for sale; and take seasonal waged work to cover, for example, school fees. The picture is similar in developed countries, though the remuneration scale is different, where an individual may combine agriculture and livestock production with work as a ski instructor, tour guide or running a guesthouse.

Yet both the mining and tourist industries have a tendency to dominate local economies and undermine their diversity. Only by actively supporting the development of related sectors, and making concerted efforts not to weaken existing patterns of work, can these industries strengthen rather than overwhelm local economies.

6 Ways forward

This report has illustrated the global importance of mountain resources and the people who are their custodians. Effective strategies for sustainability in these regions have to be mountain-specific and fully involve the people who live there.

A recent report by mountain experts stated: “Mountain environments ...require a different approach to development compared to lowland areas... national legislation and policies do not adequately address the special conditions and problems of mountain regions and their inhabitants.”¹⁴⁰ There is a need for the urgent development of new legal and policy frameworks, at international but also national and decentralised levels.

Some countries have developed, or are in the process of creating, national-level legal instruments related specifically to their mountain areas, for example, Italy’s 1994 Law on Mountain Areas; France’s 1985 Law on Mountain Development and Protection; and in 1993 Vietnam established a ministerial level Committee of Ethnic Minorities and Mountain Areas.

Building on difference and diversity

Building on mountain people’s sustainable use of a wide range of resources and activities is crucial as a means of minimising risk in often-fragile environments. Over-reliance on one sector, such as tourism, to bring jobs and economic security ignores this mountain-specific strategy of diversity. People traditionally work within a range of formal and informal networks such as collectively managed and individually owned resources, subsistence and cash economies, private and public sectors, and they make use of cultivated and ‘wild’ resources. Greater recognition of the value and purpose of the multi-sectoral nature of mountain economies would enable agencies to take a similar approach to development initiatives and policy-making. “The highest priority should be given to providing flexibility of opportunities and alternative livelihoods to the peoples of mountain regions, both South and North...”¹⁴¹

Taking a different route

Issues such as transport and communications also need to be seen through a different lens. Recognition that roads are not the only answer has also proved effective: ropeways, suspension bridges, or

air transport where viable, can provide effective transport links. Animal-based transport, cost-effective and integrated into many traditional local livelihood systems, will also continue to play an important role. At the same time, the most modern technology has huge potential: IT can greatly improve links between mountain communities and the rest of the world, providing opportunities for new economic, social and cultural development.

Whatever the means of travel, high transport costs mean mountain traders often start at a disadvantage when competing in the marketplace. But there are ways to turn limitations into advantages and to capitalise on limited quantity but high quality goods, including location-specific foods and handicrafts. Supporting the development of micro-enterprises and cooperatives, and introducing regional trademarks which identify and protect the origin and quality of a mountain-specific product – these approaches all meet the need for mountain-specific development actions.

The international dimension

For certain aspects of development there is a powerful international dimension. The issue of water illustrates the urgency for global action on mountain-related issues. Mountain watersheds play a crucial role in the world's water supply, a supply that is increasingly under threat, yet "International water laws are weak and unable to deal with the water issues involved in most large rivers that cross international borders."¹⁴²

Action at international level is also required to develop innovative ways of supporting sustainable resource use, and ensuring a fairer share of the benefits accrued by those living in the lowlands are returned to mountain communities. Governments need to work together to identify and implement means to value these environmental services – stewardship and conservation of water, land and biodiversity, for example. Difficult to calculate in terms of monetary value, such roles nonetheless have real financial costs if ignored or undermined, such as flood damage, water pollution, loss of species. Financially acknowledging this role should help conserve the resource base for mountain societies and for the global population, as well as future generations.

Mountain-specific research

Payments for environmental services are just one area that needs dedicated research and development. Policy-makers also need reliable information about the populations in mountain regions and associated demographic and socio-economic trends.

This report has highlighted the phenomena of selective depopulation and its impacts; “Urbanisation is another issue that has accelerated in many mountain environments... In the North, urban intensification is due to rapid increase in summer and winter recreation and in the South urban expansion in mountain cities like Quito, La Paz, Kathmandu, and Mexico City, is largely due to rapid internal growth and immigration.”¹⁴³

“Practical idealism”

One step forward in mountain-specific research and education is the establishment of the University of Central Asia (UCA) in Tajikistan. The aim is: “To serve the educational and development needs of people across the vast mountain zones of Central Asia and beyond. Through university degree programmes and research and through training courses available to the general public, UCA will foster economic and social betterment throughout a region that modern development has largely bypassed.”¹⁴⁴

“UCA strategically addresses one of the fundamental problems of our era, dire poverty in mountain regions... UCA promises to prepare entrepreneurial leaders for these neglected regions, at the same time enabling thousands of adults of all ages to obtain the skills that will enable them to feed themselves and their families...it is an exercise in practical idealism,” says Frederick Starr, Chairman of Central Asia Institute, Johns Hopkins University, US.¹⁴⁵

People – the key

“Investment in people is the best way to protect the mountains for future generations.”¹⁴⁶ Further research and development in mountain regions must involve local people. In many senses they can be considered the real ‘experts’ on mountain development and should be involved in planning and decision-making. There is a danger that the focus on reducing poverty in mountain communities is paying insufficient attention to the resourcefulness and knowledge of these same communities.

If mountain people are to query, challenge, and improve development initiatives within their regions and gain a more equal relationship with those living outside them, they need a more powerful voice. The stakes are high, not just for those who live in mountains, but for the billions of people who depend on their resources, and for the global ecosystem. Mountains matter: powerlessness and impoverishment in these societies has implications for everyone.

Notes

- ¹ Jane Pratt, message to Mountain Forum, 19 March 2001
- ² 'Oral Testimonies from Mount Elgon, Kenya' *Voices from the Mountain* The Panos Institute 2001; see also www.mountainvoices.org
- ³ *Investing in Mountains: Innovative Mechanisms and Promising Examples for Financing Conservation and Sustainable Development* TMI/FAO 1997; www.mtnforum.org
- ⁴ 'Oral Testimonies from Sudety Mountains, Poland' *Voices from the Mountain* The Panos Institute 2001. See also www.mountainvoices.org
- ⁵ These statistics can be found at www.mountains2002.org or www.peopleandplanet.net, unless otherwise indicated
- ⁶ Ives J D in Messerli B and Ives J D (eds) *Mountains of the World: A Global Priority* Parthenon Publishing Group 1977, pp 79–81
- ⁷ 'Humanitarian aid and food security' UN Wire, 27 November 2001
- ⁸ 'Eradication of Armed Conflict and Hunger: Essential First Steps to Protect Mountain Ecosystems and Alleviate Poverty in Mountain Communities', FAO Press release, 11 Dec 2001
- ⁹ Chapter 13 – Managing Fragile Ecosystems: Sustainable Mountain Development – was included in Agenda 21, the Plan for Action endorsed at Rio
- ¹⁰ The Abisko Agenda: Research from Mountain Area Development *Ambio Special Report (11)* The Royal Swedish Academy of Sciences, February 2002
- ¹¹ See www.globalmountainsummit.org
- ¹² Dennison D *High Priorities: Conserving Mountain Ecosystems and Culture* Worldwatch Paper 123, 1995
- ¹³ Kapos V, Rhind J, Edwards M, Price M and Ravillious C, 'Developing a map of the world's mountain forests', in Price M F and Butt N (eds), *Forests in Sustainable Mountain Development* IUFRO5, 2000.
- ¹⁴ United Nations University news release, 'Mountain Ecosystems Endangered' 27 January 2002, www.unu.edu/mountains2002/news/news-release.html
- ¹⁵ 'Areas of terrestrial and coastal ecosystems promoting solutions to reconcile the conservation of biodiversity with its sustainable use' UNESCO Man and the Biosphere Programme www.unesco.org/mab/
- ¹⁶ *Tourism and Sustainable Mountain Development* Mountain Agenda, 1999; available at www.mtnforum.org
- ¹⁷ International Potato Centre www.cipotato.org
- ¹⁸ Fleury J 'Mountain Biodiversity at Risk' *IDRC Briefing No.2* September 1999 www.idrc.ca/media/MountainBio_e.html
- ¹⁹ International Year of Mountain www.mountains2002.org
- ²⁰ Fleury J 'Mountain Biodiversity at Risk' *IDRC Briefing No.2* September 1999
- ²¹ Dennison D *High Priorities: Conserving Mountain Ecosystems and Culture* Worldwatch Paper 123, 1995
- ²² See www.mountainvoices.org
- ²³ 'Oral Testimonies from southwest and northeast China' *Voices from the Mountain* The Panos Institute 2002. Will be available at www.mountainvoices.org
- ²⁴ 'Oral Testimonies from southwest and northeast China' *Voices from the Mountain* The Panos Institute 2002 Will be available at www.mountainvoices.org
- ²⁵ UNESCO Man and Biosphere Programme: www.unesco.org/mab/
- ²⁶ Carpathian Large Carnivores Project: www.clcp.ro/index.htm
- ²⁷ Testimony 1, Pakistan collection, Panos archive. Will be available at www.mountainvoices.org
- ²⁸ Butz D 'Resistance, representation and third space in Shimshal village, Northern Pakistan' *ACME: An International Journal of critical Geographies* 1 2002
- ²⁹ SNT Management Plan: www.brocku.ca/geography/people/dbutz/shimshal.html
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- ³² Jane Pratt, message to Mountain Forum, 19 March 2001
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Key resources

International Year of the Mountains: www.mountains2002.org

An information resource on mountain issues, including a media section, events list and links to other sites.

Based at FAO, Via delle Terme di Caracalla 00100, Rome, Italy.

Tel: +396 570 55978 email: mountains@fao.org.

Mountain Agenda:

Five key documents, including tourism, water, forests and energy and sustainable development, available online at www.mtnforum.org by email Agenda@giub.unibe.ch, or postal order from CDE (below).

Mountain Forum: www.mountainforum.org

Network for sustainable mountain development: email lists; on-line library; and directory of contacts. Currently contains 10 draft thematic papers for the Bishkek Summit.

Mountain Forum Moderator, Mountain Forum Global Information Server Node, The Mountain Institute, 245 Newman Avenue, Harrisonburg, VA 22801, US.

Tel: +1 540 437 0468 Fax: +1 540 437 0494 email: mfmmod@mtforum.org

People and the Planet: www.peopleandplanet.net

A global gateway into the interrelated issues of population, poverty, health, consumption and the environment.

Mountain Voices: www.mountainvoices.org

The Panos Institute's unique online archive of indepth interviews – many of them quoted in this report – communicating the views and experiences of people living in mountain communities around the world.

The Mountain Institute (US): www.mountain.org

1828 L Street NW, Suite 725, Washington, DC 20036

Tel: +1 (202) 452 1636 Fax +1 (202) 452 1635 email: summit@mountain.org

International Mountain Society and Mountain Research and Development Journal

Contact: CDE - Centre for Development and Environment, Hallerstrasse 12, Institute of Geography, University of Berne, Steigerhubelstrasse 3, 3008 Berne, Switzerland.

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International Centre for Integrated Mountain Development (ICIMOD): www.icimod.org

Promotes integrated mountain development and seeks to improve the living standards of mountain populations of the Hindu Kush-Himalaya. IYM Coordinator: Armila Shakya, ICIMOD, PO Box 3226, Kathmandu, Nepal.

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High Stakes

The future for mountain societies



Mountains represent one quarter of the world's landscape and are home to at least one in 10 of the global population. They are the source of 60 to 80 per cent of the world's fresh water supply. Nearly half the world's biodiversity hotspots are in mountain areas, and the peoples who live there are rich in culture and specialist knowledge.

Yet there is a "vertical gradient to poverty". Some 80 per cent of mountain populations live below the poverty line. As roads open up previously remote areas, bringing access to markets, education and health services, they also accelerate the rate of change and leave mountain resources vulnerable to exploitation. Living on the roof of the world has always demanded resourcefulness and resilience, but increasing environmental destruction, climate change, conflict and natural hazards are making it ever more precarious.

This is not just of concern to mountain societies; it is of global importance. Some two billion people worldwide depend on mountains for much of their food, hydroelectricity, minerals and timber. At the Rio Summit in 1992, it was recognised that: "mountain environments are essential to the survival of the global ecosystem".

This report, driven by the voices and the concerns of mountain peoples themselves, outlines the issues and examines the ways forward in this, the International Year of Mountains.

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