

Mountain agenda: Environmentally sustainable and equitable development opportunities

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SYNOPSIS

Mountain environments merit special consideration in development policy. While the last two decades have witnessed a steady increase in global attention to mountain regions, mountains have yet to be firmly integrated into the conservation and development agenda(1). Primary emphasis needs to be placed on understanding the tremendous diversity, limited production scale, and fragility of mountain environments. Likewise, it is important to recognize that community control of resources and women's integration into environmental initiatives is critical to building sustainability and equity across many sectors.

The adoption of sound policies, however, is only a beginning. During the last 20 years, the language of sustainable and equitable development has been added to the policies of many organizations. Nevertheless, in this same period mountain peoples have become poorer and have progressively lost control over even a bare subsistence base of resources. Global ecosystems (including mountains) have deteriorated, genetic material has been lost, and the resources upon which human survival depends have dwindled. The emergence of new mountain countries, particularly in Central Asia and the Caucasus, is an

important phenomenon of the 1990's that has not yet been addressed in terms of mountain development.

Effective policies, and the accompanying financial and technical resources required for their implementation, must now be moved outward from regional administrative centers. They must reach the steep slopes and fragile environments that are home to a rich diversity of mountain cultures.

SPECIAL CHARACTERISTICS OF MOUNTAIN ENVIRONMENTS

Mountain environments are characterized by unique qualities which set them apart from all other global ecosystems. Understanding these special characteristics is a critical first step in the formulation of policies and action priorities capable of bringing real benefits to mountain regions.

The verticality of mountains resonates in their primary biophysical characteristics of diversity, high geomorphic energy, and ecosystem fragility. The socioeconomic characteristics of mountain peoples are inextricably linked to this dramatic ecological setting.

Biophysical Characteristics of Mountain Environments

Mountains are globally significant reservoirs of biodiversity. They contain rich assemblages of species and ecosystems, in a dense juxtaposition of ecological communities. Climatic variations, including temperature, radiation, wind, and moisture availability, occur over very short distances. The dynamic and unstable nature of mountain environments leads to dramatic differences in successional stages of vegetation, as do variations in rock type and derived soils.

Remoteness often implies less modification by human activities. Mountains act as a refuge or sanctuary for plants and animals long since eliminated from more transformed lowlands. Serving as biological corridors, mountain ranges connect isolated habitats or protected areas. Freestanding mountains, such as Mount Kenya or the Virunga volcanoes, function as biological islands.

As a global gene bank, mountains represent food security and future resources for humanity. In addition to natural biodiversity, including thousands of species with medicinal and food value, mountain communities are also the custodians of a rich diversity of crop cultivars and livestock breeds. Offering potential benefits in terms of genetic variety, disease resistance, and pest resistance, the preservation of these resources is of global importance.

Tremendous geomorphic energy is unleashed in mountains, taking forms of volcanism, uplift, erosion, landslides, glaciallake outbursts, earthquakes, avalanches, torrents/debris flows, sedimentation, and floods. While natural

hazards constrain many activities, the geomorphic energy of water also presents great opportunity. Mountains are rich in water resources, blocking and rechanneling regional cloud masses which shed their moisture load to form the headwaters of valuable surface streams.

Mountain ecosystems are fragile. Their low resilience arises primarily from steepness, isolation, and low temperatures. Soils tend to be thin, young, and highly erodible. Endemic species which have evolved over centuries of isolation are easily threatened by introduced species. Low temperatures cause vegetation growth and soil formation to occur very slowly. In this harsh environment for biological life, the time scale of ecosystem recovery may be hundreds of years (2).

In fragile mountain ecosystems, scenarios of environmental imbalance and unsustainable use emerge quickly and in a more pronounced manner than in comparatively resilient lowland areas (3). Increased landscape instability and degradation, loss of natural biodiversity, and loss of crop cultivars and livestock breeds are several of the indicators of ecosystem imbalance in today's mountains.

Inaccessibility

Because of slope, altitude, terrain conditions, and natural hazards, inaccessibility is the most widely recognized feature of mountain areas (4). The concrete manifestations of inaccessibility have a profound effect on the social systems and economies of mountain communities.

Infrastructure and services are generally lacking, especially in education, health, and agricultural extension. Transport costs are high, markets are distant, and the value-added cost of goods and services severely limits production flow both in and out of mountain areas. High investment costs further limit infrastructure and economic development. Even with abundant hydropower resources, rural electrification in mountains can be prohibitively expensive.

Isolation, poor communication, and slow penetration of outside changes are another facet of inaccessibility. Communities that have existed in relative isolation for many generations may be vulnerable to exploitation by outside interests.

Throughout history, mountains have provided refuge to people fleeing aggression. Switzerland is well known for its role as a mountain sanctuary, particularly during World War II. Many of the Himalayan hill peoples originally fled from either India or Tibet. Today, militant rebel forces are typically based in mountain areas. Other illegal activities may flourish in mountain areas as

well, such as moonshine production in the Appalachians during the Prohibition era in the United States.

Diversity of Culture and Adaptation

Isolation, migration patterns, and ecosystem diversity all contribute to the rich traditions and tremendous cultural diversity of mountain peoples. In a single village district in remote eastern Nepal, six hamlets with six separate languages and religions occupy slightly different ecological zones along the rising slope of a ridge. Some experts believe that the traditional cultures of indigenous groups may be equally, or even more threatened than biological diversity (5). In an isolated valley of the Yagnob River in Tajikistan, close to the historical center of Samarkand, communities still speak the WestPersian dialect of the 7th century A.D. and maintain traditional agricultural practices. At present this cultural group is under the threat of extinction because of forced relocation to new cotton growing areas in the Fergana Valley (6).

As with biodiversity, cultural diversity is a global resource. We can turn to diverse cultures to look, for example, at methods of conflict resolution, such as the Chipko movement's contributions to peaceful protest. Diversity in social systems and gender roles offer insights to the human experience which may be of unique value as societies move toward a more integrated global community.

Stemming from ecosystem diversity is the tremendous variety of adaptive strategies of mountain peoples, both within and between cultural groups. Men and women must successfully manage a multiplicity of roles and production systems in order to survive. Typically, seasonal resources are exploited over a wide range of different ecosystems, and risk reduction strategies are broadly applied to combat the vicissitudes of a dynamic and sometimes hazardous natural environment.

This profound knowledge of seasonal and attitudinal ecological linkages, fragile ecosystem management, and great micro environmental diversity characterizes the mountain way of life. In addition to their knowledge of natural resource and biodiversity management techniques, mountain peoples maintain a rich storehouse of crop and livestock varieties now a vital world resource. Women, as primary users of subsistence resources, are especially knowledgeable about edible, medicinal, and utilitarian plants. Such knowledge, developed over centuries of use, is of global significance and importance.

Small Scale of Social and Production Systems

The frequent isolation of mountain communities from one another, and the need for collective action in overcoming many of the challenges of a harsh environment, often give rise to the development of strong informal institutions.

For example, collective construction of houses or fields is known as belkbi in mountainous Chechnia and as hashar in Tajikistan(7).

Traditions and collective decisions, while generally unwritten, command great respect. Because of their distance from regional centers of power, mountain communities have typically relied on these small, informal systems for social and legal administration. Many communities have a long history of contact with outlying areas through trade or migration, although these tend to be small in scale.

Similarly, the resource base of mountain agricultural, pastoral, and economic systems is well suited to subsistence and other small-scale, diverse production strategies. Fragile mountain ecosystems offer marginal potential for large-scale commercialization and limited replicability of experiences from the lowlands. High intensity use of resources can permanently damage the inherent capacity of the production base.

Mountains are rich in unique but often narrowly defined - productive niches. These traditionally provide timber, fuelwood, bamboo, herbs, flowers, and essential oils, in addition to ceremonial, medicinal, utilitarian, and edible plants.

Marginality

Mountains are characterized by political and economic marginality with respect to surrounding lowland areas and regional centers of power. Mountain peoples generally have little or no voice in national affairs, even on issues which directly affect their own resources and communities. Access to external markets is often available only on unequal and unfavorable terms of trade. Worldwide, the relative and absolute poverty of mountain peoples is striking (8).

Exceptions do, of course, exist. The Kikuyu, Chagga, and Bagisu peoples of East Africa are much better off socioeconomically, and have received more development funding, than their lowland neighbors. In other parts of Africa, such as Ethiopia or Morocco, the situation is very different. Here mountain peoples have been driven onto their steep lands through aggression. Their severely degraded environments offer only a marginal livelihood (9).

Harsh environments and their impacts on biological life represent another form of marginality in mountains. Larger amounts of energy human, biomass, and from other sources are needed to sustain life and economic development in mountains than in the lowlands (10). Low temperatures, difficult terrain and reduced oxygen levels at high elevations contribute to greater biological energy needs.

Mountains commonly occupy transboundary areas between nations. This can result in a confusing political or economic climate for communities whose national boundaries cross traditional trade routes, or cut through culturally linked areas. Also a national military presence may be imposed on local populations.

Gender Roles in Mountain Ecosystem Management

Traditionally, mountain women are accustomed to a significant level of resource control, and a clear voice in the affairs of the household and community. Women in mountain areas play a predominant role in the management of subsistence resources. Sexual division of labor tends to be less strict than in lowland areas, and caste or class distinctions play a comparatively less important role in defining women's work.

Nevertheless, there are strong dichotomies between men's work and women's work. In forestry, women tend to manage for diversity. Preferences for tree species are based on multiple utility within the household including food, fodder, fuel, medicine, and income needs. Men's preferences are more often based on usefulness as timber, to be used either for construction purposes or for sale.

Men have the most frequent interaction with government officials and extension workers, and often have links to the monetized economy and external markets. In times of food deficiency or economic stress, men will frequently seek seasonal work outside their own community.

Women, on the other hand, interact primarily with family and neighbors. In addition to their major involvement in agriculture and resource management, women take responsibility for food processing, cooking, water carrying, and child care. Mountain women have traditionally engaged in small-scale entrepreneurial activities based on the use of natural resources (11). This nondomestic forest economy can be critical to meeting household subsistence needs, especially in times of hunger or economic hardship.

Mountain women work long hours to provide the basic needs of their families. They share agricultural and livestock tasks fairly evenly with men, but add an additional 45 hours each day for basic domestic needs. Comparison of mountain and plains communities in Nepal shows that hill women work significantly longer hours in subsistence natural resource management than do plains women, and do a higher percentage of related work compared to men (12).

Poor women bear an even greater work burden. Women of poor households in several surveyed mountain communities in Nepal performed labor in the forest sector to the virtual exclusion of men (98%), and contributed 60% of labor in the animal husbandry, agriculture, and water sectors (13). Women, especially

poor or landless women, are principal users of community owned resources, and the first to suffer if these are restricted or degraded.

Spirituality and Appeal

The high scenic value and recreation potential of mountains are universally recognized. Sacred places, pilgrimage sites, and areas of taboo abound in mountains. There appears to be a universal tug on the human spirit exerted by the sight of snow-clad peaks, or the mystery of hidden valleys. Religious leaders or sacred traditions can often be powerful allies in promoting conservation, eg. Buddhist lamas and lamas have long played a noteworthy conservation role in the Himalayan ranges.

There are many references to the role of mountains in nurturing the human spirit. Whether this is through sacred, religious, spiritual, aesthetic, or adventuring experiences, the renewal of the inner spirit is an important benefit that mountains offer to humanity.

ENVIRONMENTAL ISSUES AND CONCERNS

Historically, adaptive mechanisms of mountain peoples have been centered on local ecosystems and resources. In the last five decades, however, change has been more externally driven. Development interventions, large infrastructure projects, and growing market pressures have pushed self-sufficient economies towards commercialization, often with negative consequences. Some typical threats to mountain environments arise from agricultural expansion, construction of dams and roads, commercial and illegal logging, mineral and hydrocarbon exploitation, tourism, and activities related to war and insurrections (14).

It is clear that outside influences will continue to increase along with improved access and communications, health care, education, tourism, migration, and seasonal labor. Concurrent pressures for economic integration with lowland and/or international communities will also increase. Along with economic opportunity, however, there are many risks associated with rapid cultural, economic and environmental change. Persistent negative trends show increased marginalization of mountain peoples and rapid degradation of mountain ecosystems.

Even the best sustainable development strategies must face the difficult dilemma of how to maintain traditional and often unique cultural integrity and practices while promoting some level of integration with a more modern world. Cultures in danger of disappearance through modernization are commonly found in the mountain world, from the Svans in Georgia, to the Rhaeto-Roman minorities of Switzerland or the Callaway people of Bolivia (15).

Contemporary stresses in mountain ecosystems and communities are profoundly affecting the status of women and children. In a few cases, women have been able to organize to protect traditional rights and gain access to new resources of education and income. In much of the developing world, however, women's status is declining rapidly as their work becomes less visible and less valued. Traditional subsistence livelihoods and support networks are eroding, along with depletion of natural resources and loss of common property resources. The common shape of women's lives throughout the developing mountain world is that of poverty and a tremendous work burden.

Market Forces and the Side Effects of Public Interventions

Unfortunately, environmental and equity implications of modernization and infrastructure development have not been seriously considered by the development community. The evidence increasingly suggests that high investment programs and large-scale commercial development have increased the magnitude of the resource problem (16). For example, large infrastructure development and road expansion are major causes of environmental degradation and marginalization of mountain communities. A frequently documented scenario is the abandonment of local forest protection systems near newly built roads. Knowing that outsiders are unlikely to respect traditional informal agreements, local people experience alienation from their own land base and engage in short-term profiteering.

In the dynamic, high-risk environment of mountains, large-scale human infrastructures can occasionally lead to unexpected, sometimes catastrophic effects (17). Collapsed roadbeds and breached dams are an all too common sight throughout the mountain world.

Another divisive issue is the degree to which mountain economies can be successfully integrated with regional or global ones. While such integration may be inevitable, the highly unequal terms of trade lead to increasing marginalization and poverty in the mountain world. Especially in the context of recent changes, mountain peoples have not been able to organize themselves adequately to manage their own resources and orient development initiatives to their own advantage (18). Devaluing of tradition, out-migration (especially of young men), and disintegration of local institutions is a common result of unsuccessful interaction with outside forces.

Well-intentioned rural development and environmental conservation initiatives frequently undermine existing informal community organizations and sustainable production systems. For example, cash crops may displace food grown by women for their families and preclude them from using traditional conservation practices. Tending the cash crops adds an extra burden to an already tiring day, while the income from these crops is seldom under their direct control. Women also suffer increasing isolation as traditional labor

exchanges deteriorate because of additional work demands and privatization of profit (19).

Another area in need of attention is the intellectual rights of those with knowledge of the use of medicinal or useful plants, and those who provide genetic source material. These are seldom if ever recognized in the marketing of mountain products.

Fortunately, the social effects of current trends in mountain regions are not all negative. In many areas, there is increased access to education, health, and other services, and in a few areas successful entry has been made into the market economy.

Extractive Industries

Mountain regions have throughout history been net exporters of resources to the plains. Their economic trusts of minerals, forests, water, and recreation are frequently viewed as valuable national or regional assets, with little regard for the rights of local populations. Negative environmental impacts of extractive industries have been particularly severe in mountain ecosystems.

Most mountain regions have at some point experienced marginalization or disinheritance of their peoples due to extractive activities. Coal mining operations in the Appalachian Mountains a century ago disinherited thousands of mountain farmers, and even today the economic returns from this industry are largely diverted to surrounding metropolitan centers. Giant hydropower plants in the Caucasus, Kirghizia, Tajikistan, and The Altai mountains are vivid examples of the negative effects of the extractive model. Resources, income and land were withdrawn from these regions, with tremendous local costs in terms of resettlement, poverty, social conflict, and environmental degradation (20). Similar scenarios are common in the timber and hydropower industries.

Population Growth

The seriousness of unchecked population growth cannot be overstated. However, it should not be entirely blamed for resource depletion. Domestic firewood consumption, for example, is only a minor contributor to global deforestation (21). In Tanzania, 90 percent of all industrial fuel comes from wood (22). Likewise, in traditional mountain farming systems, the contribution of agriculture to erosion is negligible. Most erosion is due to commercial farming, roads, and natural processes (23).

Birthrates in mountain communities will decline only when action is taken to reestablish women's control over productive resources. Conventional approaches to development often reinforce gender bias by undervaluing women's work and granting male's disproportionately greater access to land,

credit, and productive resources. This encourages childbearing as women's primary route to social status and economic security. The most direct and significant actions to ease the population crisis may be to increase women's access to education, training, land ownership, and credit, thereby giving them significantly more control over their own lives(24). Education delays the average age at marriage, an important determinant of fertility rates. For married women, non-formal education increases their awareness and their ability to discuss important issues openly, in addition to granting them higher status within the community.

The objectives of the International Planned Parenthood Federation (IPPF) are illuminating in terms of addressing population issues. They include enabling women to work together, teaching them skills through training, improving the status of women, and improving the welfare of families through increasing family planning knowledge and practice. In Sindhupalchok District of Nepal, the IPPF Family Planning Association has successfully combined family planning with environmental action. A widespread concern about diminishing forest resources was translated into a popular fodder tree plantation program, followed by a remarkable acceptance of family planning. The birth rate in this area is now almost one-half the national average(25).

Tourism and Recreation Industries

Tourism markets can bring significant economic benefits both locally and nationally, but they also place great demands on fragile mountain ecosystems and isolated cultures. Frequently, tourism is accompanied by trends toward intensive cash cropping, excessive fuelwood cutting, and a dramatic increase in livestock numbers into once stable traditional systems. In industrial countries, mass tourism and recreation may be the largest threat to mountain communities and environments (26).

Tourism is currently being touted as the most promising sustainable development strategy in mountainous areas of the CIS and Russia. However, many of the expectations are naive in view of the lack of infrastructure and experience in local communities, as well as the mechanisms for the return of tourism derived income back to the local area. Some practices, such as hunting the Marco Polo goat and other rare animals by rich Western tourists, are licensed by the very state agencies directed to protect these species. Income from such activities never reaches local communities (27).

Careful management is needed both to maintain the exceptional recreational values of mountains while capturing benefits locally. Overuse in confined corridors requires intensive management for waste disposal, infrastructure maintenance, and fragile ecosystem protection.

War and Insurrection

Globally, war and its effects are significant negative social and ecological forces. Mountain peoples and ecosystems are not spared in this regard. In the former Soviet Union, emerging mountain countries face a grim future of civil war (Tajikistan), internal strife (RussiaChechnia), and interethnic conflicts (IngushOssetian, GeorgianAbkhazian)(28). In addition to direct acts of war, modern guerrilla fighters and others fleeing aggression often take refuge in mountains, upsetting ecological balances and social structures.

Global Consumption Patterns and Industrialization

The sustainable use of natural resources is inseparable from consumption patterns. There is an important and increasing awareness of the negative global environmental effects of environmentally costly consumption patterns in industrial countries. Industrialization also places serious environmental stress on mountain ecosystems in terms of air pollution and acid rain. Mountains are particularly vulnerable to the effects of climate change as a result of accumulation of greenhouse gases.

POLICIES FOR SUSTAINABLE MOUNTAIN DEVELOPMENT

Sustainable and equitable development policies specific to mountains need to be firmly placed on the global development agenda. The unique characteristics of mountain environments and peoples create special policy exigencies for these regions. Policy priorities for sustainable mountain development are discussed below and listed in brief form in Table 1.

Decentralization

Decentralization of planning and control processes within agencies and governments can contribute substantially to effective conservation and sustainable development in mountain regions. Field offices, for example, should be allowed flexibility to plan for locally changing conditions, rather than pressured to achieve predetermined targets within fixed budget cycles.

A commitment by national governments to decentralize is critical at all levels, and across all sectors (29). In other words, political liberalization should be accompanied by similar progress in the economic and social service sectors. As efforts are made to delegate decision-making and resource control, accountability and responsibility must be strengthened at the most local level.

Balancing Local and National Needs

National economic and political interests need to be balanced with basic needs of mountain populations. These interests may conflict directly with a rhetorical

commitment to participatory management and ecosystem conservation. The environmental and social impacts of extractive activities, and equitable terms of trade for mountain peoples and products, should be carefully assessed. Timber production, for example, should not come at the expense of subsistence needs.

Given a favorable policy environment at the national level, communities can have the freedom to organize and take collective decisions. Locally derived management strategies and integrated program approaches are most effective in controlling environmental degradation. Such approaches should inform, and be supported by, government policy and program design (30).

National governments may benefit from a reevaluation of biological and cultural resources in their mountain regions, particularly in the context of sustainable and equitable development. New technologies such as geographic information systems and global positioning systems are valuable in developing a spatial framework for action, especially in delineating corridors of bio and ethnodiversity or potential transboundary protected areas. Pilot or demonstration projects in specific mountain areas are needed (31).

National and International Cooperation

Freedom from war and military conflict are prerequisite to any successful development policy. For the many mountain areas currently suffering from armed conflict, plans for peace are urgently needed, and may require high levels of national and international cooperation. Components of these plans may include international peace parks or free economic zones (32). Even in times of peace, international cooperation is essential to protect fragile transboundary regions.

Cooperation and support are also needed to establish national and international networks and information centers specializing in mountain issues. Community involvement and outreach is a pivotal role to be played by such centers (33).

Integration of Women

The benefits of integrating the advancement of women with environmental protection to mountain communities are diverse and fundamental. They include strengthening resource use and subsistence rights, maintaining cultural integrity, reducing poverty and marginalization, and conserving overall environmental quality.

A major convergence of policy agendas can be recognized regarding conservation of mountain ecosystems, sustainable development, and the advancement of women. Integration of women must be specified at the policy level in order to institutionalize women's traditional roles as environmental

managers. While the need to incorporate gender sensitive perspectives has become a litany in development policy rhetoric, there has been little if any success in transforming this rhetoric into action.

Donor agencies and governments have not been successful in integrating women into their own institutions (34). Gender issues cannot be effectively addressed if they are only of concern in the Target n community. In-house training is needed to increase staff and management awareness of gender issues, and women need to be integrated into decision-making positions at all levels.

As primary users of natural resources, women make daily decisions regarding the management of land, water, forests, and livestock. Moment's activities and knowledge should be recognized as directly relevant to national level policies, and as valuable assets in meeting national and project goals for environmental protection.

Longer Time Scales for Implementation

A constant point of tension between donors and implementers is the short time scale of project lives and funding cycles. The best may last 5 or 10 years, a short period in which to develop sustainable community structures, and a tiny fraction of the time scale of ecosystem response and recovery in mountains.

Lengthening funding cycles to provide more stable financial support will significantly promote long-term project success, particularly in the inaccessible, tradition rich, and diverse ecosystems of mountains. Flexible allocation at the field office level can help to avoid flocking in" unproductive programs, donors could also play a more supportive role in transitioning good programs from one funding cycle or theme to the next.

Role of NGOs and NGO/Government Partnerships

Experience has shown that many NGOs (nongovernmental organizations) have been successful in initiating dialogues with local residents, and in overcoming the problems associated with factionalism and the hurdles posed by locally influential individuals. Success has been based on long-term commitment, flexibility, motivation, an integrated (nonsectoral) approach, and an emphasis on organizing and facilitating rather than technical promotion. International NGOs have been effective partners with national and local NGOs, offering specialized training, facilitation, and mobilization of outside resources. The role of NGOs as catalysts and intermediaries needs to be encouraged, and the support of the government to this end is very important. The complementarity in the functioning of NGOs and government agencies needs to be identified and acted upon.

NGOs play a critical research and development role, in undertaking innovative programs which are frequently both high-risk and resource intensive. Once proven, successful approaches are taken up by larger agencies and donors, the cross subsidy of NGOs to large agencies includes not only tested ideas, but perhaps even more importantly, trained and talented personnel. NGOs provide a critical training forum for local personnel. The best trained staff of NGOs continually move on to higher paying and higher profile jobs, typically with larger organizations or donors. This valuable contribution builds sustainability and innovation across many sectors.

MOUNTAIN DEVELOPMENT IN ACTION

Effective development action in mountain regions incorporates the constraints and comparative advantages of mountain environments. It focuses on community action and long-term commitment. Primary emphasis is placed on understanding the tremendous diversity, limited production scale, inaccessibility, and fragility of mountain environments. By maximizing the natural linkages between sound ecosystem management and women's status, environmental sustainability becomes an achievable goal.

Concurrent with a focus on locally driven initiatives, a cooperative working relationship with government must be established and maintained. Community facilitators, as the frontline actors, should be supported by skilled government liaison personnel. Successful strategies for mountain development action are discussed below and listed in brief form in Table 2.

While continued research and study of sustainable mountain development priorities is of great importance, a number of proven practices already exist. The most immediate challenge is to extend these environmentally sustainable strategies until they become the norm for mountain development initiatives. This will require a major reorientation of current implementation practices and the mobilization of significant financial and technical resources for mountain regions.

Understanding the Local Context

The great diversity of mountain ecosystems, cultures, and adaptive strategies requires a significant commitment of time and personnel in order to develop appropriate sustainable development initiatives. Project staff must understand the local ecological systems and stresses, the existing environmental management strategies, cultural norms, community organization and subgroups, existing formal or informal leaders, and gender roles. They should consider the differential access to both the resource base and decision-making power within a community based on political or economic status, caste, gender or other factors. Non-formal tenure or use rights must be acknowledged.

Successful implementation must be based on sensitivity to local values and beliefs. It should build on existing institutions and indigenous technological knowledge, and recognize and incorporate local religious or community leaders, especially women.

In addition, it is vital to understand the nature of changes, whether physical, biological, cultural, or socioeconomic, that affects the area. Project staff must have adequate time to become familiar with the people of the project area and to build confidence and understanding. As activities commence, a continuous dialogue should be maintained between staff and the local population. This dialogue must include women and the very poor, as well as men.

This approach has been applied by the Peruvian Foundation for the Conservation of Nature in their efforts to conserve Manu National Park, one of the biologically richest areas in the Andes Mountains. Project staff spent years living in villages near the park, listening closely to people's pressing needs. Only then were a diverse mix of projects launched in a buffer zone surrounding the park(35).

Strengthening Community Organizations

The success of conservation and development interventions is intimately linked to their degree of local control and commitment. Locally driven initiatives are much more likely to address real needs, both environmental and socio-economic. In the Dominican Republic, local women's groups rehabilitated degraded hillsides left behind after destructive timbering practices. Their techniques of small-scale gardening proved both self-sustaining and soil conserving (36).

To initiate local action in conservation or development opportunities, and to ensure that project activities reach their intended stakeholders, significant resources must be committed to facilitating and strengthening community organizations. Local people must be encouraged to articulate their own needs, and to seek solutions on their own. Programs should reinforce local management systems, particularly local female leadership, and incorporate such existing infrastructure into program design. By incorporating existing leaders and nonformal institutions, local resources can be mobilized and community priorities addressed.

Community organizations may need the help of outside facilitators in getting started. This is an area where NGOs have been particularly effective. Initiating and nurturing community organizations should begin at the level of resource users with common interests, making special efforts to be sure the voices of women and the poor are represented. From these smallest units, organizations reflecting the real priorities and needs of the community may be built. Note

that it can take a significant effort to identify true groupings of actual resource users, as distinct from local committees or political groups.

Training can be a powerful tool in mobilizing local environmental knowledge. Training needs are most strongly felt in the development of public communications skills, leadership skills, strategic planning skills, and in confidence building. Training does not always have to be conducted by outside experts; community or farmer exchanges are also a valuable resource.

Mentoring by local citizens who have achieved community action is particularly valuable. Potential community leaders, with support and training, can assume a catalytic role in identifying and initiating appropriate activities. Outside facilitation may be needed to link community needs with support from relevant agencies or resources.

In establishing users' groups, sustainability must be addressed from the initial stages. At the level of ecosystem use, the long-term managers of the mountain environment are the married women. These are often the only stable, fixed members of households in mountain communities. Men are frequently absent for trading, distant livestock pasturing, or employment, and young women generally leave the community at marriage. Married women have many more constraints on their time, but by placing them at the core of environmental management, the essential element of sustainability can be assured.

Mountain communities may need reinforcement in validating the cultural, historical, and ecological value of their traditional way of life. The perception of backwardness introduced by contact with outsiders or more developed regions can be a major stumbling block to community action. Awareness of the true and valuable role that mountain communities and resources play in the environmental, social, and economic sustainability of their regions is essential. Public awareness and national recognition of this role can be a great asset to sustainable developments (37).

Strengthening local institutions must be done in the context of decreasing dependence on external assistance. Technical and financial inputs should be offered only where they are clearly sustainable. Once community organizations are in place, local control and decision-making should be encouraged, and project activities should be handed over to them as soon as is practicable.

Access to Resources

Women and men need legal and secure rights to cultivate land and use natural resources. In particular, mountain communities with their traditional reliance on a dynamic and fragile subsistence base must have firm control over these resources in order to manage them sustainably. Any conservation or

development intervention must exercise extreme care in recognizing and strengthening such traditional or informal rights.

In addition, access should be assured to new or nonsubsistence resources such as information, income generating opportunities, training, and credit. Women and the very poor are frequently most difficult and resource intensive populations to reach. Their participation in decision-making, and conscious attention to their tenure and use rights, is essential to protect their status within the community and allow them access to development resources. Income generating programs must address the distribution and control of community and household income.

An Integrated Approach to Mountain Development

At the local scale, those projects which are small-scale and multisectoral are most effective at resource management and community development. By targeting an area or community rather than a sector, and incorporating local initiatives, significant results can be achieved.

Sectoral approaches can increase their chances of success by building in flexibility, particularly in establishing entry points. Save the Children in Nepal begins its successful community forestry programs with literacy classes for women. From the beginning the literacy material is formatted to provoke discussion of environmental issues (e. g., the letter "l "for landslide). After two full years, with classes meeting every night for two hours, the committed women in these classes form users' groups. Since 1990 more than 150 users groups have taken on community projects and many have been granted legal control of community forests by the government (38).

In mountain regions, where services are lacking and extension agents are scarce, sectoral field officers can dramatically increase their credibility and effectiveness if they are willing to assist communities with their most felt needs. Their sectoral activities can then be taken up with increased confidence.

There is obviously a need to build institutions at all levels, and on a larger scale the sectoral approach may be more efficient than integrated multiagency approaches. For larger institutions and infrastructures to be successful in terms of sustainable development, decision-making and control of resources need to be firmly delegated to field offices and onsite personnel. Ecological, social, and community concerns should be fully integrated at all levels.

Small Scale of Production Systems

Mountain environments are well suited to small-scale, diverse production strategies. Commercial agricultural products should only be introduced into

mountain areas if they do not undermine subsistence or fragility requirements. In order to be economically brought to market, commercial products must combine characteristics of relatively high value and low weight.

Modern agricultural interventions which focus on high yield (high input) crops, hybrids, or other "improved" seed introduction contribute to reduced diversity and resilience and are not appropriate to mountain agriculture. Likewise, monocultures, mechanization, and external inputs such as chemical fertilizer have not proved suitable in the diverse, unstable environments of mountains. In Zimbabwe, traditional millet seeds were used by one woman who was too poor to purchase the introduced improved Seeds. When droughts later caused others' crops to fail, her crop survived. A women's organization was able to purchase 25 bags of her traditional seeds and distribute them to other growers in surrounding villages (39).

Harvesting and trade in mountain products, which can contribute substantially to local economies, should be carefully monitored for sustainable practices and local capture of benefits. Local management knowledge should be incorporated to manage fragility and sustainability challenges. Equitable or favorable terms of trade need to be established for mountain communities.

Non-timber forest products include many essential subsistence items such as fodder, fertilizer, and soil. For example, both subsistence and small-scale commercial use is made of honey and wax, flowers, seeds, leaves, wild fruits, fibers and flosses, bamboo, rattan, cane and grasses, oil seeds, tans and dyes, gums and resins, pine oleoresins, rubbers, drugs, spices, aromatics and insecticides, lac, sandalwood, and seeds for propagation.

Small-scale harvesting of these products for local use has generally been sustained over many centuries. In expanding to supply cottage industries or outside markets, however, new balances must be found. Gorkha Ayurvedic, a small cooperative which produces medicinal herbs in Nepal, has found that traditional forest herbs must be cultivated in fields, agroforestry areas, or woodlots, if they are to be harvested sustainably. Small-scale production for external markets can bring considerable benefits to mountain regions, if carefully undertaken. Access to credit and assistance in production, design, and especially marketing are often necessary inputs.

Full Integration of Women into Project Design and Implementation

There is a general lack of appreciation of the remarkable environmental management skills of women in mountain communities (40). Raising the gender awareness of planners and project staff can have a dramatic effect in integrating women's concerns at many levels, leading to improved environmental results. Women should be fully integrated into all phases of

project design and implementation. Women in the field are the true frontline actors, and should be enthusiastically supported.

Incorporating women throughout the program design and implementation phases is not easy. Significant resources of time and personnel must be committed to recruit and support capable women. The rewards, however, are increased sustainability and greater social and environmental effectiveness. In eastern Nepal, the newly established Makalu Barun National Park made a commitment to hire female game scouts and rangers. In order to fill 5 of the 12 scout positions with qualified women, senior park wardens walked for several weeks through remote villages and conducted over 250 individual interviews with both men and women. Once the women were hired, significant resources were dedicated to supporting them effectively, such as providing companions during remote travel, more frequent home visits, strict policies regarding sexual harassment, and extra living quarters.

Despite extensive rhetoric to the contrary, planners still prefer to address women in specialized women specific programs. Projects that target women, however, seldom include resource issues. Rather, the focus tends to be on extension of women's perceived household roles, such as cottage industries or improved cooking stoves. Yet, success in ecosystem management interventions is dramatically increased when project staffs have a high awareness of gender issues and a commitment to fully integrating women.

For example, Pakhribas Agricultural Centre made little progress in vegetable growing extension work with male farmers in eastern Nepal for its first six years. In 1986, however, when the emphasis was switched to women (the actual vegetable growers), the number of gardens increased from 75 to 210 in a single year (41).

The number of women who are trained or available for training, in the natural resource or environmental disciplines is very limited. There is also a scarcity of female accountants, bankers, and policy makers. Once a core group of women is established in an organization or project, however, it is easier to recruit other qualified women through existing staff networks and the "safe" culture that is propagated.

Standard training and academic curricula in the natural resource disciplines seldom include women's concerns or contributions. Subsistence needs are generally relegated to a brief discussion of "minor forest products" or home economics. Graduates of such programs may need to relearn their disciplines in the context of the small-scale, diverse production systems (largely managed by women) which are suited to the fragile ecosystems of mountains.

Training can be an effective means of bringing women into environmental and resource management initiatives. Training in ecosystem management issues

brings the highest rewards when it also includes topics such as leadership, decision-making and new technologies(42) .

At the community level, reducing the heavy work burden of women is an important first step in making it possible for them to participate in program activities. The benefits of an innovation must be clearly understood if women are to allocate time to it.

Existing women's organizations are likely to be highly knowledgeable, but lacking in power and resources. Because of their lack of legal rights to property, women often experience great difficulty in obtaining credit, material inputs, or funding for environmental or development initiatives. Yet, women's superior repayment and loan utility performance in mountain areas and elsewhere has been repeatedly demonstrated, and should encourage banks to develop loan programs targeted for women (43).

Concern for conservation action is very strong among rural mountain women, since they are the first to suffer as resources diminish. Healthy forests and grazing lands, with firm tenure or use rights, provide them and their children with a secure future. Access to new social and economic opportunities can make this future bright.

Monitoring and Evaluation

Internal and participatory monitoring of projects should be required and supported. It should be built in as a regular part of planning and implementation, not an extraordinary event that takes place once or twice a year. It is important to monitor success criteria in terms of gender and equity. Monitoring and evaluation must consider satisfaction of basic needs, equitable sharing of benefits, and attainment of self-reliance. It is important to assess unintended results, such as possible changes in de facto tenure or use rights due to project interventions. Some indicators of sustainability are given in Table 3.

External monitoring should be interactive and supportive. Rather than forcing implementers toward arbitrary targets, emphasis should be placed on a flexible learning approach which improves process and supports innovation.

Communities should be assisted in evaluating programs themselves, as a step toward assuming management on their own. This monitoring should include gender and equity analysis. Community monitoring and evaluation tools should be independent of literacy (44).

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Table 1. Policy Priorities for Sustainable Mountain Development

Bilateral and Multilateral Agencies and Donors * Decentralize decision-making and control of resources

- * Place mountains and mountain peoples firmly on the development agenda
- * Promote international cooperation to reduce armed conflicts, to encourage environmental conservation, and to increase the free flow of information regarding mountain regions
- * Integrate women fully
- * Lengthen funding cycles and assist in transitioning good programs
- * Increase the weight placed on ecological, social, and grassroots input to investment decisions
- * Strengthen partnerships with NGOs

National Governments

- * Decentralize across the political, economic, and social service sectors
- * Recognize the unique characteristics of mountain regions and peoples in formulating national policy
- * Support grassroots community organizations
- * Increase community control over local resources and access to secure land tenure
- * Balance national economic interests with national environmental goals and basic needs of mountain populations
- * Carefully assess impacts of large infrastructure projects and extractive industries on mountain environments
- * Integrate women fully
- * Strengthen partnerships with NGOs
- * Develop cooperative agreements with neighboring nations to protect transboundary mountain regions

Table 2. Successful Strategies for Mountain Development Action

- * Understand the local context
- * Establish and maintain a cooperative working relationship with government
- * Strengthen community organizations
- * Build local commitment and encourage local control over development decisions
- * Secure access to resources
- * Apply an integrated approach
- * Focus on smallscale production systems

- * Integrate women fully
- * Monitor and evaluate

Table 3. Some Indicators of Sustainability in Mountain Environments

Biophysical

Biodiversity maintained or enhanced; no increase in erosion or landslides.

Agriculture

Diversity of crop cultivars maintained; erosion stabilized; land holdings not fragmented; reliable crop yields; decreased dependence on non-local inputs; shift away from intensive cash cropping or ; mono-cropping; increased extent of fallowing, crop rotation, and intercropping.

Animal Husbandry

Diversity of livestock breeds maintained; over grazing controlled.

Women's Status

Access to and control over social, economic, and natural resources improved; work burden reduced; family planning adopted.

Community

Water available for domestic and agricultural use; decreased time for fodder, fuel, and food gathering; decreased use of imported fuels; diversified resource management practices; better health; local ; institutions strengthened; respect for social sanctions as opposed to legal measures; decreased migration.

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Notes to readers

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