HOUSEHOLD FOOD SECURITY AND NUTRITION IN MOUNTAIN AREAS

AN OFTEN FORGOTTEN STORY

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key terms</td>
<td>3</td>
</tr>
<tr>
<td>Household Food Security and Nutrition in Mountain Areas</td>
<td>4</td>
</tr>
<tr>
<td>Introduction</td>
<td>4</td>
</tr>
<tr>
<td>Nutritional Status of Mountain People and its Implications</td>
<td>4</td>
</tr>
<tr>
<td>Causes of Poor Nutrition in Mountain Communities</td>
<td>5</td>
</tr>
<tr>
<td>Who is Most at Risk of Malnutrition?</td>
<td>9</td>
</tr>
<tr>
<td>Coping Mechanisms</td>
<td>9</td>
</tr>
<tr>
<td>Mountain People in a Changing Environment</td>
<td>12</td>
</tr>
<tr>
<td>Conclusions</td>
<td>15</td>
</tr>
</tbody>
</table>

**BOXES:**

- Gorkha District of the Himalaya, Nepal                                 | 7    |
- Andes Mountains, Peru                                                  | 9    |
- Mt. Kilimanjaro, Northern Tanzania                                     | 10   |
- Pakistan                                                              | 11   |
- Upper Pirai Area of Bolivia                                           | 12   |
- Upper Rwaba Watershed of the Makamba Province, Burundi                 | 13   |
- Oued Sbaihyia Area of Tunisia                                          | 14   |
KEY TERMS

**AS PER DEFINITIONS ESTABLISHED BY FIVIMS**

**Anthropometric**: based on human body measurements

**Food security**: exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996)

**Food insecurity**: low level of food intake, which can be transitory (when it occurs in times of crisis), seasonal, or chronic (when it occurs on a continuing basis)

**Malnutrition**: physiological condition resulting from inadequacy or imbalance in food intake or from poor absorption of food consumed

**Micronutrient deficiency**: lack of essential vitamins and minerals resulting from unbalanced food intake and specific problems of absorption of food consumed

**Undernutrition**: result of prolonged low level of food intake and/or poor absorption of food consumed. Manifestations include wasting (low weight for age due to the slowing of skeletal growth and stature), stunting (low weight for height due to deficits in tissue and fat mass) or underweight (low weight for age due to chronic or acute malnutrition), reduced cognitive ability, poor health status and low productivity.

**Vulnerability**: presence of factors that place people at risk of becoming food insecure or malnourished
HOUSEHOLD FOOD SECURITY AND NUTRITION IN MOUNTAIN AREAS: AN OFTEN FORGOTTEN STORY

On the occasion of the International Year of Mountains, the Food and Nutrition Division of the Food and Agriculture Organization of the United Nations (FAO) commissioned a literature review to explore the nutrition situation of mountain people. This exercise confirmed the relative lack of literature addressing the issue. While there has been extensive discussion of agricultural systems and livelihoods in mountain areas, rarely are the implications of those systems on nutrition elaborated. Similarly, existing nutritional data is as a rule not disaggregated on a geographical, ecological or livelihood basis and literature on poverty, food insecurity or vulnerability does not consider the mountain context. Nevertheless, the scattered data that are available point to an alarming food and nutrition situation in some mountain areas. At the same time, there are also examples of positive change in other areas. Key findings are summarized below.

INTRODUCTION

Given the extreme diversity of mountain contexts in terms of ecosystems, economic development and socio-cultural aspects, people working in community development in different parts of the world are often struck by the fact that there is often more in common among mountain people from different cultures and continents than between mountain people and lowland people within the same country.

Nutritionists often work in mountain areas because food insecurity and malnutrition are recognized there as significant problems. When they try to understand the causes of malnutrition of mountain communities in the Andes or in the Himalaya, how people cope and what could be done to assist them, the same issues recur.

This paper is based on interviews, a literature review and documentary research. Its objective is to discuss the common features of nutrition and food security among people living in mountain areas, with particular attention to developing countries.

NUTRITIONAL STATUS OF MOUNTAIN PEOPLE AND ITS IMPLICATIONS

Nutrition information on mountain people is difficult to find and analyse. The absence of readily usable data reflects to some extent the lack of awareness and attention to mountain nutrition among development professionals, researchers, planners and policymakers, both from the nutrition perspective and from the mountain development perspective. The issue seems by and large to fall through the holes. Where anthropometric studies have been carried out, usually as part of a project or a specific research, results consistently reveal significant problems of low weight, stunting and wasting in children.

In a 1995 study in Peru (Kumar et al.), higher rates of malnutrition were observed among children under the age of five living in mountainous areas as
compared to the national average for the same age group. The study found that 43.7 percent of mountain children studied suffered from acute malnutrition (very thin children) compared to a national average of 36.5 percent. Similarly 13.4 percent of mountain children suffered from chronic malnutrition (stunted children) compared to a national average of 10.8 percent. Studies have also revealed that there is a discernible reduction of birth weight in babies born at high altitudes (Scrimshaw & Schürch 1998).

Iodine deficiency is also found in highlands and mountain areas. The combination of glaciation, melting snow and heavy rainfall in mountain areas can cause leaching, which depletes mountain soil, water and crops of iodine. The people of the Andes, Himalaya and Chinese mountain ranges are considered at highest risk (Grantham-McGregor 1999), but iodine deficiency is also found in many European mountain areas. Iodine deficiency disorders can be prevented by the iodization of salt. They are responsible for a range of conditions including increased pre- and post-natal mortality, goitre and cretinism. The effects on the intellectual development of individuals are seen as a major constraint to community and economic development in mountains.

Data from the Himalaya and the Andes (Kuhnlein and Pelto 1997) also indicate a high prevalence of Vitamin A deficiency in mountain areas. This is likely due to a combination of poor food practices (people for example may not be aware of the importance of diet diversification or of the nutritional needs of infants) and limited access to foods that are rich in Vitamin A (they may be too expensive or not available in the area).

When people have insufficient food to meet their minimum energy and nutrient needs, they are not able to enjoy a normal and healthy life. Infants with low birth weight (less than 2.5 kg) caused, inter alia, by maternal malnutrition, are at greater risk of illness and death, impaired cognitive development and (for females) poor pregnancy outcomes later in life. Stunted baby girls grow into small mothers who in their turn deliver underweight babies. Children do not grow well and have more learning difficulties. Their immune systems are affected and they are less resistant to infections.

In adulthood the accumulated effects of malnutrition can reduce labour productivity, which in turn limits the earning potential of households and communities. While at the individual level severe malnutrition is clearly a life-threatening condition, at community level malnutrition results in reduced overall economic productivity.

**CAUSES OF POOR NUTRITION IN MOUNTAIN COMMUNITIES**

Nutritional deficiency disorders such as protein-energy malnutrition (PEM) and deficiencies of micronutrients such as iodine, iron and Vitamin A, are the result of numerous factors, including insufficient or inadequate intake of food, caused by poverty and/or inappropriate feeding practices. Infections and parasitic diseases, which are linked to poor environmental sanitation and poor health and care practices and services, also contribute to micronutrient deficiencies. These factors are closely related to characteristics commonly found in mountain areas (Jodha 1990, Ellis-Jones 1999).
**Fragility**

Mountain ecosystems are generally fragile. Biophysical characteristics of mountain areas combined with inappropriate land use can lead to major and often irreversible environmental damage. In terms of agricultural production, mountains have a low carrying capacity and the exploitation of natural resources is limited. The delicate human life-support system which has evolved over centuries is highly vulnerable if subjected to increased external pressure.

**Inaccessibility**

Inaccessibility is due to the particular terrain in mountain areas. It is a primary cause of the physical isolation of mountain people. Steep slopes and harsh conditions challenge mobility. The establishment and maintenance of infrastructure is difficult and expensive. Therefore, transport costs to mountain areas are higher. This reduces the ability to trade and affects the supply, availability and price of agriculture inputs, such as seeds, fertilisers or pesticides, which are needed for food production. It also reduces the availability of affordable foods other than those that can be obtained locally, and limits income generation opportunities, thereby undermining household food security. As noted earlier, inaccessibility also reduces access to social services, negatively affecting the health and education standards of mountain communities.

**Marginality**

Marginality is the outcome of both fragility and inaccessibility but is also closely associated with historical and political processes. This is as true in the Appalachia of the United States as it is in the Hindu Kush Himalaya or the Andes. While the reasons which led to this marginalization may be long forgotten, the cultural gap remains and is strongly embedded in language and traditional practices. Marginality leads to the separation of mountain people from mainstream economies and greater dependence on the natural resources available in mountains, with clear implications for the ecological balance of the natural resource base.

Lack of understanding of mountain communities by government institutions has led to inappropriate decision-making and under-estimation of indigenous knowledge, experience and economic systems. As a result mountain people often have had to adapt their livelihoods to policies, laws and interventions that further compromised their access to food and productive resources, undermined their knowledge system and social organization and marginalized them further.

Food consumption patterns are one of the main characteristics of local cultures: they reflect local food availability but also people’s knowledge and perceptions, traditions and social organization. While this is clearly the case everywhere in the world, it is particularly true of marginalized mountain communities which have been less exposed to external influences and in particular “modern” or “scientific” information.

It is important to keep fragility, inaccessibility and marginality in mind when trying to understand the causes of malnutrition in mountain areas. The
nutritional status of a given individual is the ultimate outcome of a variety of factors, classically clustered into household food security (that is the capability of a household to have access to sufficient and appropriate food, good health and adequate care for all household members), all of which are directly or indirectly affected by these characteristics.

GORKHA DISTRICT OF THE HIMALAYA, NEPAL

Subsistence farming is the most common activity. However, only 20 percent of the households produce enough food for their own consumption. The remaining households suffer from food deficit for 3 to 9 months per year. To a certain extent, this is compensated by seasonal outmigration of men, but there is also widespread undernourishment. There are no roads in the area and all transport is done on foot. Education and health services are also insufficient to meet the needs of local communities. (PUCD 2001)

Food insecurity of households

Agriculture originally evolved from the need of communities to feed themselves in a given environment. This is essentially still the case in many mountain areas where subsistence agriculture remains the core of the household economy. Food consumption is therefore both the driving force as well as the outcome of mountain livelihood systems and social organization. Given the lack of alternative sources of income, mountain communities remain essentially agricultural, and farming systems are the key determinant of household food security. What people eat depends largely on what they grow and raise in the area in which they live.

Mountain areas are usually characterized by relatively poor soil quality and often harsh climate conditions that slow vegetation growth. In addition, inaccessibility and remoteness of mountain areas are obstacles to both supply and marketing of agricultural inputs and production, thereby further limiting opportunities for commercial agriculture. As a result, livelihood systems of mountain households often combine a variety of activities such as crop cultivation, agro-pastoralism, handicrafts or trade. For many households, permanent or seasonal migration of selected members of the households in search of complementary income has become an integral part of the livelihood system. Local economies are only partly monetized and the lack of cash drives many households into indebtedness. Access to food is therefore often a problem, both in terms of quantity (seasonal food shortages, as well as recurrent crisis) and quality (unbalanced diets).

In both the Northern mountain region of Viet Nam and the Uttar Pradesh region of the Central Himalaya in India, for example, over 90 percent of the work force is involved in agriculture (Maikhuri, RK et al. 1999, FAO-FIVIMS, draft 2001). Mountain agriculture is characterized by intensive smallholder production of both subsistence and cash crops. While terracing is common in large parts of Asia and Latin America, it is very labour-intensive and is not always used by poorer farmers on steep slopes and in unfavourable territory.
Crop production is combined with livestock (or herders can barter with sedentary farmers). The contribution of milk products and meat to diets of mountain people is therefore important. Though milk is less obtainable during the winter, when animals no longer yield it due to the cold temperatures, it can be converted into cheese products which are more easily stored and consumed through the winter months. In case of acute food shortage, livestock can also be sold for income. Generally, however, extremely poor people cannot afford livestock. Seasonality of agriculture production affects local food availability and consumption. As mentioned earlier, crop growth is slower at higher altitudes and farmers can often only get one harvest a year from their land. This harvest can be vulnerable to early and late frosts, spring drought and hailstorms.

Livestock are also at risk of increased mortality rates during cold seasons when iced snow covers grasslands. Examples include incidents in the mountains of Lesotho, as well as in Tibet (Carloni 1996, Miller 2001). The result is that many mountain communities must endure several food-insecure months every year. In the vulnerability profile for the Northern mountain areas of Viet Nam, food was found to be regularly lacking for about three to five months of the year (FAO-FIVIMS, draft 2001).

**Poor health**

In mountain areas there can be a high incidence of diseases due to harsh weather conditions, poor hygiene and malnutrition combined with poor curative and preventive health services. Diarrhoeal diseases are particularly threatening because they compromise nutritional status through reduced dietary intake, poor absorption and nutrient losses. In an environment where such diseases are common, children typically suffer recurrent infections and are unable to recover completely from each bout of illness.

Immunization programmes have managed to reach some mountain areas, but they are not found in all. Health facilities often require travel by foot for several hours and do not necessarily offer good quality or affordable services.

Infant mortality rates are significantly higher in mountain regions compared to lowland areas. One example is Peru where survey results indicated that the infant mortality rate for a mountain area was 61 per 1 000 live births and child mortality was 89 per 1 000 live births. In contrast, the rates for the urban lowland city of Lima were 30 and 40, respectively (Kumar 1995). The level of maternal mortality is also rather high in mountain areas.

**Care problems**

Care of infants and sick children can be a major problem when parents or caretakers lack awareness and information and cannot afford the time to care for their families. Traditions in this matter are important but have been given little attention to date.

Child care is compromised by the labour-intensive nature of the agricultural systems and low-income status of mountain residents. Frequently, both parents are gone all day (or one of them can be gone several weeks in a row, leaving the other to carry out both productive and reproductive activities). When
grandmothers are not there to help any longer, the child is left with a sibling who is not able to give adequate care.

Increasingly care of HIV/AIDS orphans and patients is becoming a significant problem in mountain areas: food-insecure areas, such as mountain areas, are areas of outmigration. Single migrants (male or female) are exposed to risky sexual behaviour and may therefore be infected when working in an HIV/AIDS endemic area. When they are sick, they return to their communities of origin to die and pass on the disease. Mountain areas are no exception, but here again information remains anecdotal in the absence of specific studies.

**WHO IS MOST AT RISK OF MALNUTRITION?**

Many mountain inhabitants in developing countries are vulnerable to poor nutrition and food insecurity, but not all mountain people are food insecure. Also, some mountain households have more resources than others and are therefore less vulnerable to food insecurity.

Women are often more vulnerable to nutritional problems due to their lower economic and social status. This can be exacerbated in mountain communities where women are forced to take on a greater share of household and agricultural labour when men migrate to urban areas for education, work and income. The physiological needs of women, particularly in their role as mothers, contributes to their vulnerability. Children and the elderly, by nature of their dependence and their physiological needs and constraints, are extremely vulnerable as well. In some mountain societies, women and girls may be more vulnerable due to prevailing gender biases.

Many mountain areas are home to a variety of ethnic minorities. These groups may be unaware of their rights and of the services and assistance available to them. They may not be recognized by national policymakers or development institutions. They may therefore be at further risk of malnutrition.

**ANDES MOUNTAINS, PERU**

“69 percent of the indigenous population live in poverty, and 45 percent of the non-indigenous population are poor. According to an official survey carried out in 1991, 45 percent of the people lived in rural mountainous areas, where the largest indigenous population of Peru is concentrated. Out of approximately 1 245 000 households in these areas, two thirds possess less than one hectare of arable land which does not normally enable them to meet minimum nutritional requirements.” (WFP/EB.1/98/5/2)

**COPING MECHANISMS**

When faced with food insecurity or urgent cash needs, mountain people have developed a number of adaptive measures to deal with food shortages. These include reducing the size and modifying the composition of meals, cutting down
on the number of meals, taking children out of school to scavenge for food, selling productive assets, migrating and sending children away. But they also look at ways to strengthen the resilience of their livelihood systems to prevent recurrence of these events. It is important to understand and review these mechanisms in order to encourage effective and sustainable strategies and propose alternatives for those mechanisms that will have an immediate or longer-term negative effect on nutrition, food security and livelihoods.

**Home gardens**

As the Chagga home garden system in Tanzania has proved (see box), home gardens are an effective means of counteracting food insecurity, offering a source of diverse nutrients as well as products that can be sold at markets. It would be beneficial if such practices were better known and more widespread in mountain areas.

**MT. KILIMANJARO, NORTHERN TANZANIA**

The Chagga home gardens “enable the farmer to sustain production with a minimum of external inputs, and thus provide a good model of land use for extrapolation to other areas with similar ecological and socio-economic characteristics. Management techniques applied today have been continuously refined and tested over the ages and handed down from one generation to the next. An average home garden of 0.68 ha produces about 125 kg of beans, 280kg of parchment coffee and 275 bunches of bananas.” Other fruits and vegetables, including maize and root crops, are also grown, the diversity ensuring that total crop failure never occurs. Fuelwood requirements are also partially met by home garden production. “The problem lies in the need to increase productivity [to meet the demand for food of a rapidly growing population] while retaining the stability of the present system.” An additional problem is presented by the current trend of young people emigrating, leaving mostly older people to manage the home gardens and disrupting the traditional transfer of the “knowledge and experience required for the successful management and perpetuation of the complex multi-cropping system.” (Fernandes et al. 1985)

**Use of protected areas**

Mountain pastoralists often resort to taking livestock to more distant grazing land or clearing forest land to create new pastures. In some cases, this includes protected areas. Violations of conservation boundaries occur both through deforestation and encroachment, sometimes putting rare wildlife at risk. For example, in the Simien Mountain National Park of Ethiopia, farmers crossed buffer zones when droughts diminished the availability of grazing land for their livestock herds. National park guards fear that the competition for scarce grazing land drove the rare Walia ibex out of the park for good (UN-EUE 1999).

**Consumption of wild foods**

In many areas, consumption of wild foods was reported as a coping mechanism to address food shortages. Yet some of the plants eaten have been associated
with increases in intestinal diseases and other health problems. In Ethiopia, for example, Nejiro, a small plant that is dug out and eaten with its roots, causes headaches and vision problems. Another, grass pea, eaten in times of desperation and intense food insecurity, increases the risk of Lathyrism, an irreversible crippling disease (UN-EUE 1999).

**Migration**

All too often, migration is the only solution to avoid hunger and malnutrition. While in most cases it is the adult males of a household that leave to find work elsewhere, often whole families leave their communities to relocate in lowlands. Sometimes, when one less mouth to feed will help the rest of the family, children, often female, are sent to urban areas where they provide household help or are sold.

**PAKISTAN**

"Mountain farmers are having to eke out a living for their increasing numbers from small plots of sloping agricultural lands that are losing soil fertility and valuable topsoil. The burden on their womenfolk and children to manage the difficult agricultural work has increased as able-bodied male members are forced to search for incomes outside their farms and villages. The story with pastoral groups is not very dissimilar as degrading pastures and ranges also reduce traditional sources of food supply. Upland people practising various types of shifting cultivation are also being forced to reduce traditionally maintained fallow periods and are clearing more forest lands to compensate for losses in food supply." (ICIMOD)

The seasonal or prolonged migration of men from mountain communities is characteristic of most mountain areas. It increases the workload and therefore the vulnerability of women, children and the elderly. There is more work, little food, less time available for tasks perceived as non-essential such as food preparation, child care and hygiene. Food production can be affected by labour constraints. In other cases, such as in Ethiopia, it has proved even more harmful as the men migrating are only able to generate enough income for their own survival and are consequently incapable of sending earnings back to support the families left behind.

**Food aid**

When food aid is necessary, it is not always guaranteed to reach those most in need because of insufficient infrastructure, mismanagement, biases in the distribution process and poor communication. Cost of transport of bulky commodities to needy mountain people is sometimes prohibitively high. Poor information exchange and mis-communication between mountain communities and administrative centres in lowlands can prevent assistance from reaching the most food insecure.
MOUNTAIN PEOPLE IN A CHANGING ENVIRONMENT

Mountains are dynamic environments and are therefore undergoing a variety of ecological, social and economic changes. These changes may have positive and negative consequences on the factors that determine nutrition. It is important to understand and monitor these consequences in order to protect and promote food security, nutrition and livelihoods in mountain areas.

UPPER PIRAI AREA OF BOLIVIA

“The scarcity of truly arable land has led most of these settlers to clear their fields on steep slopes. The rapidly decreasing productivity of these fields has resulted in the continued expansion of the agriculture frontier at the expense of the tropical forest cover. Moreover, cattle breeding on fallow land and in the forest has been placing additional stress on the ecology of the Upper Pirai area, resulting in significant erosion through processes such as landslides, the creation of gullies and desertification, with a major impact on people's livelihoods and the local environment.” (PUCD 2001)

Climate change

In the framework of climate change, temperature in mountain areas is expected to increase and rainfall and snowfall patterns to change. The incidence of extreme weather events such as storms, floods and avalanches is expected to increase.

Higher temperatures and melting glaciers may bring about better agricultural conditions and facilitate the establishment of infrastructure, thereby increasing food supply. However, they also increase the risk of some kinds of weeds, pests and diseases that can jeopardise agricultural production and livelihoods.

Biodiversity will inevitably be altered too, and many plant and animal species may become endangered. Coping mechanisms that once ensured food security may no longer prove effective. Furthermore, as permanent frost areas decrease, the risk of rock falls and landslides may rise. Disease-carrying organisms will also move upwards and be able to thrive in areas previously unfamiliar with such hazards.

The local food and nutrition situation will therefore change as access to food, health and lifestyles change. Traditional wisdom may not be equipped to address these new elements and mountain residents may fail to realise the potential gains of a rapidly changing environment.
UPPER RWABA WATERSHED OF THE MAKAMBA PROVINCE, BURUNDI

“Population growth has also brought about rapid fragmentation of land-holdings; this in turn has led to more intensive and destructive exploitation of the natural resource base. Moreover, the lack of rangeland and the decreasing fallow periods have progressively made the traditional livestock-herding system impractical. As a result, poverty and food insecurity have become major problems in the Rwaba watershed.” (PUCD 2001)

**Demographic change**

As mentioned earlier, populations continue to grow in most areas, despite migration. This may be partly due to high birth rates and lack of family planning practices. However, in many areas it is essentially due to immigration of poor lowland people into more marginalized territories higher in the mountains.

As the population size of a given region increases, so does the pressure on land and natural resources. Intensification of agriculture commonly ensues, followed by land degradation, lower crop yields, reduced availability of land for agriculture and increased food insecurity. This problem makes the need for sustainable land use practices all the more critical.

**Changes in lifestyles, practices, and expectations**

Economic activity has shifted in many mountain areas to accommodate a cash economy that has introduced new demands into mountain communities. Agricultural production has changed to meet those needs as well as to meet the demands of nearby markets.

In Viet Nam, for example, cash crops such as tea, coffee and fruit have been encouraged in the Northern mountain areas to meet increasing demand for local markets (FAO-FIVIMS, draft 2001). However, this has reduced the production of food to meet household needs.

People’s priorities have changed, often at the expense of nutrition and food security. Changes towards a market economy and the increasing dependence on cash income have brought about shifts in household resource management, time allocation and community dynamics, sometimes altering shared tasks and responsibilities that have implications for community welfare and nutrition. Food purchasing and preparation may change and priority may be given to other expenditures. In some mountain communities, ideas regarding competition and independence have been introduced.
OUED SBAIHYIA AREA OF TUNISIA

“Natural population growth, the progressive subdivision of family land into smaller plots, technological changes and the involvement in market economy have increasingly affected the livelihoods of these farmers, leading to increased pressure on the local natural resource base (eg. intensive exploitation of arable land, overgrazing, deforestation). This has become so intensive that only a few Oued Sbaihyia families are currently able to make a living from farming and animal rearing. As a consequence, the seasonal migration of men towards coastal towns and abroad is quite common.” (PUCD 2001)

Many communal institutions and systems have been eroded by the common belief that outside models are better. Similarly, there has been a presumption that science and Western know-how are superior to native custom (Messerli & Ives 1997).

The shift from traditional agricultural practices towards market-oriented cash crops can only result in improved nutrition if: (1) food is available and affordable in local markets to meet household nutrition demands; and (2) household members, in particular the people who decide on how the income will be spent, have basic nutritional knowledge. All too often, these two conditions are not met.

Mountain farmers also find it difficult to compete with the prices of lowland farmers whose production costs are often much lower and who are closer to markets. Their lower incomes prevent them from being able to make the necessary investments to improve agriculture, as well as to import goods and technology that could help prevent food insecurity. Cash crops are often more input-intensive, susceptible to crop failure, seasonality and market laws and therefore constitute an unacceptable risk for many poor farmers.

Biodiversity in mountain areas, if appropriately managed, should result in diet diversification and therefore contribute to meeting nutritional requirements. However, in some areas, recent shifts towards cash crops have lead to an imbalance in local food systems, creating a local food deficit and encouraging unsustainable practices that result in food insecurity.

Loss of indigenous knowledge, due to ultimately lack of recognition and interest, and erosion of coping mechanisms also contribute to food insecurity. Though wild foods have contributed to food security in mountain areas in the past, changes in land use have reduced biodiversity in many regions, greatly limiting the presence and consumption of appropriate wild foods. Paradoxically, conservation efforts have increased malnutrition in some areas as people were no longer able to resort to traditional coping mechanisms, such as hunting wild animals or collecting foods, fodder and fuelwood from forests, and as nomads were not allowed to graze.

Outside influences usually generate a loss of cultural identity. Also lost is valuable indigenous knowledge, not only of possibly important wildlife such as
rare and useful medicinal plants, but also of diverse traditional foods as well as preparation and storage techniques. In addition, loss of cultural identity compromises social and cultural values that help to preserve mountain resources and lifestyles.

**Conflicts**

Mountain poverty, lack of services and imposition of inappropriate laws and policies by centralized governments that have not fully considered mountains in policies, as well as conflicts between contradictory social and economic orders, are bound to create tensions. In many countries, mountains also represent national and political boundaries of strategic importance.

These areas are frequently disputed and thus the setting of armed conflict. Mountains have also long served as places of refuge, providing homes to marginalized groups that may be involved in political and military conflicts. Mountain residents all too often become innocent victims of conflicts that are not of their own making.

Families lose their homes and land, food stores are burnt or looted, people die or are handicapped, thereby constraining labour and disrupting social networks. Food insecurity and destitution are worsened.

**CONCLUSION**

Food security and nutrition are clearly core issues in sustainable mountain development but paradoxically are often ignored in mountain-related discussions and mountain development policies and projects. Nutrition surveys usually do not enquire or tell us what kind of households malnourished people come from and what constraints they face. There is no recognition of the wealth of knowledge and experience in communities which have survived for centuries in harsh and isolated environments, or of the similarities between them.

Malnutrition leads to disease which in turn contributes to malnutrition: sickness leads to loss of appetite, which leads to weight loss and lowered immunity, and therefore further disease. Such cycles need to be understood and can only be broken by ensuring that people have access to appropriate and sufficient food throughout the year.

It is important to raise awareness at all levels of the implications of not making food security and nutrition a priority. Research, especially operational research, is needed to enable a fuller understanding of the living conditions of mountain people and their nutritional needs.

Decision-makers, both within national governments and international donor agencies, must be equipped with the information and knowledge to develop appropriate policies to support mountain development. A dialogue must be established between mountain people and external stakeholders.
Strengthening the capabilities of local communities and institutions is essential to this process. Nutrition education and training is important at both the community level and the technical level to orient people’s decisions about production and purchasing, household resource management, food processing and preparation, and food practices, particularly those related to feeding children.

While change is certainly needed, the recent evolution of the food and nutrition situation in mountain areas is alarming. There are, however, examples of positive changes in some areas. Mountain people could become a source of knowledge for each other if linkages can be established. By better understanding livelihoods, knowledge, experience and perceptions of mountain people and ensuring their full participation in relevant policy and project formulation, it may be possible to prevent destitution, malnutrition and social conflict.

References


Jodha, N.S. *Sustainable Agriculture in Fragile Resource Zones: Technological Imperatives* MFS Discussion Paper No.3 Kathmandu, Nepal: ICIMOD.


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