CHAPTER 6
Tracing Linkages between Farming, Poverty, and Environment

1. Clarifying Conceptual Chaos: An Integrated Assessment Approach

In Chapter 2, I outlined three rather mechanistic perspectives on mountain agricultural development which enjoy widespread currency in academic and development circles. One is inspired by Neo-Malthusian-classical economics, another by Boserup (1965) and historical cultural ecology (and related disciplines), and the third by world systems' analysis. I argued that each perspective brings insights, while the continued polemic defence of one or the other is not particularly useful in dealing with the complexity found in mountain systems. While recognising the contributions of each theoretical position, I further recommend a more holistic, actor-based mountain perspective in which mountain people themselves are seen as purposeful players in shaping and reshaping the mountain landscape against the backdrop of a local-global playing field. In this chapter, I want to carry this new perspective further in an effort to arrived at a more fruitful approach to integrated development. Whereas economists write off culture, anthropologists shun economic forces, and world theorists see only a monolithic globalising force which subjugates all in its path, an integrated actor-based perspective which gives some credibility to each theoretical position without accepting the excesses will be more fruitful for improving the lives of mountain peoples. To carry out this exercise, I have selected the topic most heatedly debated, both scientifically and in the popular press, that of the linkage between farming, poverty, and the environment (Reardon and Vosti 1995).

A critical reading of the mountain agriculture and development literature will immediately reveal that neither poverty nor the environment are defined in any precise manner (Reardon and Vosti 1995). It is indeed amazing that imprecise conceptualisation can generate such a huge literature by presumed scholars and development specialists. Even the frequent use of the World Bank's definition of poverty based on low per capita income (another 'can of worms') does not help much. Environment is also used in the same literature as a blanket term, virtually without any specificity, although forest and soil losses seem to be the main topics subjected to empirical analysis. More typically, it is frequently claimed that a direct causal link between 'poverty and environmental degradation' (***the vicious cycle***) operates but without specifying what kinds of poverty are degrading which components of the environment. Such blanket generalisations and assumed 'chains of causation' fly in the face of the one truism for mountains: it is dangerous to treat any phenomenon as a single, unified and static concept, whether it is poverty, environment, or population dynamics. I contend that we need a fresh approach which moves the neo-classical population-poverty-environment discussion on to a more analytical and practical plane. This requires that, at the planning level, we differentiate between different **types of poverty** and different **components of environment** so that we have more useful integrated categories for guiding food security, poverty alleviation, and environmental policies (Reardon and Vosti 1995). We also require a framework that shows linkages between decision-making/planning according to different assets and natural resources available to mountain households. Finally, we need to look at other forces (regional, national, and global) which impinge on the local decision-making process, including those external **transformation forces** favoured by both the neo-Malthusian economists and the world system theorists.

As described in earlier chapters, mountain households have complex diversified strategies to deal with the exigencies of surviving in mountain habitats. Historically, households and communities have carved out mountain livelihoods using diverse assets of natural resources, avail-

able farm and off-farm equities, as well as social capital and their own environmental knowledge. Depending on their unique circumstances, a household can be rich in some assets (social capital, indigenous knowledge, biodiversity) and poor in others (capital, infrastructure, market information). Rarely, although this may occur, is the household or community poor or rich in all assets. Therefore, mountain communities could be classified as poor in some natural resources (soils, for example), but rich in others (biodiversity). They may be poor in off-farm financial assets, but rich in terms of on-farm and social assets. Once differences in asset mixes are recognised, then we can begin to explore the precise nature of the poverty-environmental link in mountain communities. It is also important to remind ourselves that access to resources will vary among and within groups (by class, gender, ethnicity, caste). Women farmers may have less access to external resources, but they may hold specialised knowledge of the environment (in some mountain communities, women even hold the financial assets).

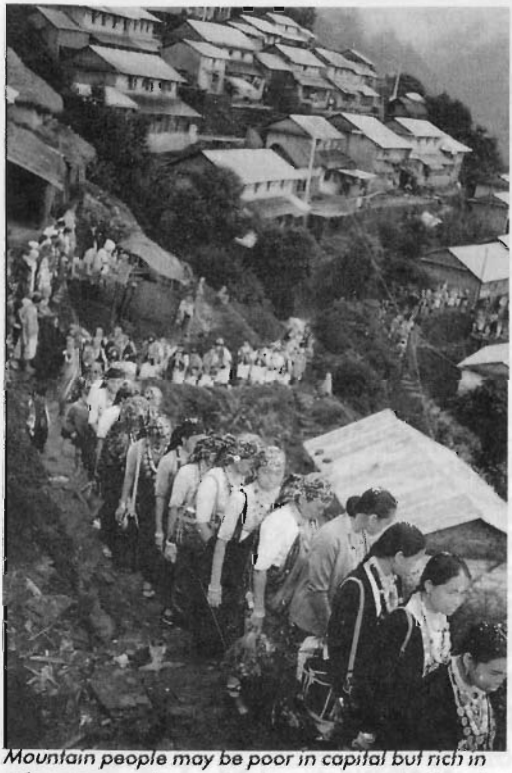
The implications of an integrated assessment approach at the household and community levels, as linked to external conditions, are that it reveals and highlights available local resources for the development process as well as the needs that exist in rural mountain communities. Through such critical analysis, we can determine that households and communities may be well-endowed in one set of local resources but lacking in others. The planning question then becomes what resources and in which amounts do farmers bring them to the project activity and what remains missing? It is essential to have the answer to this question in order to make the minimum investments in resource improvement required to maintain or improve upon the quantity and quality of the resource base. This thinking then sets the negotiating framework to place responsibility on both outside practitioners and villagers to contribute to development. It does not assume the 'client-patron' pattern of the powerful elite giving to or ***empowering the poor*** but assumes a local-national-global partnership in matching resources to solve common problems. This approach facilitates a kind of ***negotiation circle*** wherein the matching complementary re-

sources and abilities among people, governments, and those engaged in development are central to development strategies.

2. "What Does Poverty Mean in the Mountain Context? Poor in What?"

Poverty, even in the 'welfare' sense, is a complex and highly debated issue (Reardon and Vosti 1995). In China, for example, a mere forty cent (U.S.) change in the daily income level related to the World Bank's poverty definition raised the proportion of the Chinese living in poverty from seventy per cent to a third (Anonymous 1996:27). One often hears that "mountain people are poor compared to their neighbours on the plains," but such statements are rarely empirically documented. Common sense questions whether Nepalese mountain farmers are effectively poorer by any indices compared to their plains' counterparts in Bihar, India. Even if the Nepalese figured lower on an index of cash income, low external market consumption, and nutrition (very hard to measure), there are still problems with using such indicators to define the poor. Households, especially in the mountains, vary tremendously in the range of assets and resources available to them at any given point in time. Mountain people may be poor in capital but rich in other areas such as natural resources and cultural knowledge about resources and management; and they also possess specialised technologies or so-

Festival - *D. Miller*



Mountain people may be poor in capital but rich in other areas such as natural resources and cultural knowledge

cial strategies for dealing with the mountains. It may be going too far to agree that poverty is in the eye of the beholder, but simplistic, international agency indicators are often more misleading than helpful.

Based in part on the writing of Pitt (1986), Ives and Messerli have analysed in some depth the meaning of poverty in the HKH region. Their conclusions are in line with the arguments I am putting forth here; namely, government data do not account for the range and complexity of mountain community assets. The role of local debt may not be as disadvantageous as tax and other cash burdens imposed from the outside, and per capita calculations alone are not appropriate in systems based on extensive trade and barter. Many mountain trading households, which also farm for some subsistence, are actually much wealthier than plains' groups (although much of this wealth is hidden from the outside eye).

I would argue that, in using a western 'welfare' concept of poverty, we are perpetuating a very narrow flatland perspective of mountain communities. This simplified concept is based on externally derived indices of a cash economy which ignore assets specific to mountain communities. And then, even if a family is classified above some 'welfare' poverty line, it still may not have the resources to invest to restore the quantity and quality of the resource base envisaged by Agenda 21-type projects (Reardon and Vosti 1995). Unfortunately, the typical development interpretation of widespread mountain poverty—without recognising the other non-monetary forms of mountain wealth—might also have an impact in terms of lowering the self-esteem and facilitating the mental subjection of mountain farmers (Bista 1991).

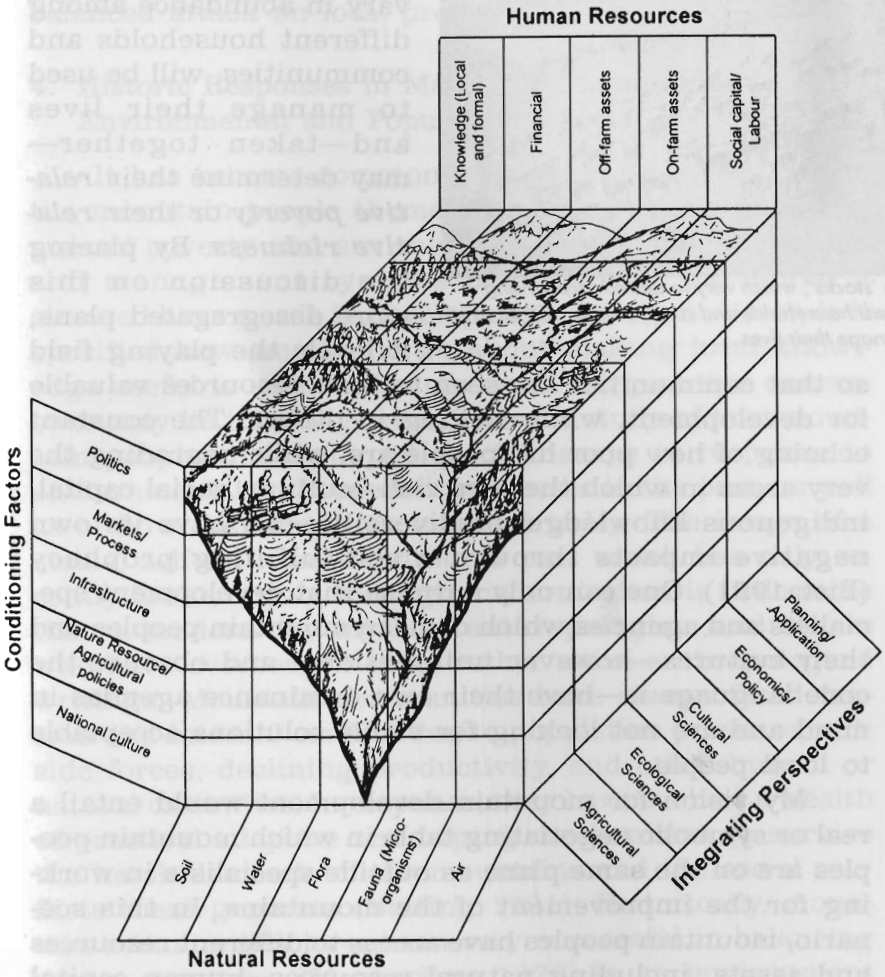
3. "What Do We Mean by Environment?"

Environment is another 'catch all' phrase that needs to be reconsidered, especially in relation to the mountains. First, we need to break down the environment according to its components: soil; water; and biodiversity of flora, fauna, microbes, and air. Frequently, different cultures will react very differently to the same ***natural resources,*** leading to the conclusion that resources are

not natural at all but culturally defined (oil had no significance to American Great Plains' Indians). In the context of these diverse environmental resources, mountain peoples may perceive them as resources useful for agriculture, wild harvesting, worshipping, ignoring, or avoiding. Varying ethnic/religious attitudes towards domestic animals in mountainous areas are prime examples (pigs are revered by some, abhorred by others). Furthermore, what is valued by the community may not be valued by the government or society at large, and vice versa (individual versus society costs and benefits). What may be of great concern to policy-makers and international development agencies may not be of particular concern to the local community. The endangered rhino in the Chitwan National Reserve is of immense value to western nations and the tourist industry of Nepal, but it may be considered a nuisance by the farmers who have to defend their crops against this marauding animal. In a recent biodiversity survey conducted by the Mountain Institute in Nepal, when local people were asked to say what is valuable about the ***conservation area*** near their villages, they were unable to respond, while they quickly provided a long list of the negative aspects (restricted grazing, unfriendly guards, wild animals). In Ecuador, I once had the opportunity of interviewing two individuals—a government conservationist and a farmer— looking at the same hillside on which part had been cleared for planting and the rest was still primary forest. The farmer lamented, "*look at that forest. They have stupidly let it go back to forest and now they will have to do a lot of work to clear it again.*" The conservationist, looking at the farmer's fields, said, "*look at that erosion, all the loss of soil and biodiversity.*"

The perceptions of farmers and scientists are dramatically different, and therefore the understanding of the problem will be different. In economic jargon, the wider society may place value on an asset possessed by the farming household, but if the household has no access to a market to convert the resources into private wealth, they may not see it as a valuable asset. In fact, they may not even recognise it as a resource. One example is medicinal plants (e.g., periwinkle) which are greatly valued by soci-

Figure 6: An Integrated Assessment Matrix for Project and Policy Implementation in Mountain Areas: Household/Community Scale



ety (or so the propaganda says), but to the farmer there may be no direct benefit from this imputed global societal value (see Aryal 1993 for an intriguing article on the Himalayan herb trade).

Figure 6 above, categorises different assets in a mountain landscape-ethno-scape which must be considered in poverty-environmental dynamics (Reardon and Vosti 1995). First, five major natural resource assets (water, flora, fauna, air, and soil) are identified. Second, five major human resources (knowledge [formal and traditional], financial capital, off-farm assets, on-farm assets, and social-la-

Mountain herds - *D. Miller*

These 'stocks', which vary in abundance among different households and communities, will be used to manage their lives .....

bour capital) are noted. These "stocks", which vary in abundance among different households and communities, will be used to manage their lives and—taken together—may determine their ***relative poverty*** or their ***relative richness***. By placing the discussion on this more desegregated plane, it levels the playing field so that communities are seen to have resources valuable for development, while lacking in others. The constant echoing of how poor hill people are, while degrading the very areas in which they are rich—culture, social capital, indigenous knowledge, biodiversity—can have its own negative impacts through a self-fulfilling prophecy (Bista1991). One can only surmise that development specialists and agencies which demean mountain peoples and their cultures—however unintentional and obscure the code language is—have their own dominance agendas in mind and are not looking for viable solutions acceptable to local people.

My vision for mountain development would entail a real or symbolic negotiating table in which mountain peoples are on the same plane as outside specialists in working for the improvement of the mountains. In this scenario, mountain peoples have access to different resources and assets, including natural resources, human capital (people and knowledge), and financial and physical capital (on- and off-farm). Operating within the context of markets, prices, and politics, farmers must allocate these resources according to their cultural goals for farming and off-farm activities. Which way the household decides has short-term and long-term environmental consequences. Policy implications, especially, emerge when looking at the impacts of external variables such as markets, price structures, infrastructure, and available technology. These policy aspects are beyond the control of the household or the community. Therefore, the state

needs to try to match the community's missing or weak resources so that integrated options can be pursued in a balanced attack on local problems.

4. Historic Responses in Mountain Communities to Environmental and Population Stress

It has become common place to suggest we look to the mountain people themselves for solutions to the issues of poverty and environment. Indigenous knowledge and management systems have become particularly stressed buzz words in development. Rarely, however, is it specified how we should go about making local knowledge useful to sustainable change. I suggest that one answer may lie in a long-term, in-depth study of how mountain peoples have shaped the landscape in response to environmental and population stresses in the past, as well as of how they continue to adapt today. The image of a stable, self-sufficient traditional past which has only recently broken down through modernisation is little more than a modern-day myth of anthropologists and others who have overbought some rather naive anthropological writings. Mountain communities have always faced tension and internal conflict due to population pressure, outside forces, declining productivity, and other human or natural calamities. In response, they have evolved a wealth of practical adaptive and coping mechanisms to survive the harsh demands of the mountains and the social conflicts these generate (Netting 1981). Historically, mountain communities have been very successful in balancing scarce resources (MacFarlane 1976) in an environment where no single enterprise is sufficient for survival, including agriculture. Cooperative work forms, such as those documented by Nüsser and Clemens (1996) for the Rupal Valley, Nanga Parbat, Northern Pakistan, remain intact even in regions undergoing transformation as a result of road and market penetration. Specialised mountain cultures possess intimate environmental knowledge comparable to that possessed by the Eskimo of the arctic/tundra or that of Amerindian hunters and gatherers in the Amazon rain forest. This coping ability accounts for the fact that the widespread famine caused by the natural

calamities which occur periodically in lowland regions has been largely absent from the world's mountain regions. To speak of these historic strategies is not to "romanticise" them for they are well documented in the mountain literature and—although altered—still persist today (cf. Messerschmidt 1995). It is more dangerous, in my opinion, to romanticise the ability of modern imported technology or scientific knowledge to save mountain peoples from their presumed "now-useless" indigenous traditions. Drawing our inspiration from Robert Netting's (1981; 1976) study of the Swiss Alps and other mountainous areas, we can identify five, major shaping behaviours in the mountain survival game. A review of these strategies drives home the point that mountain people have much to offer in improving their own lives if these cultural traditions are given a chance to flourish.

A. Cooperation/Regulation

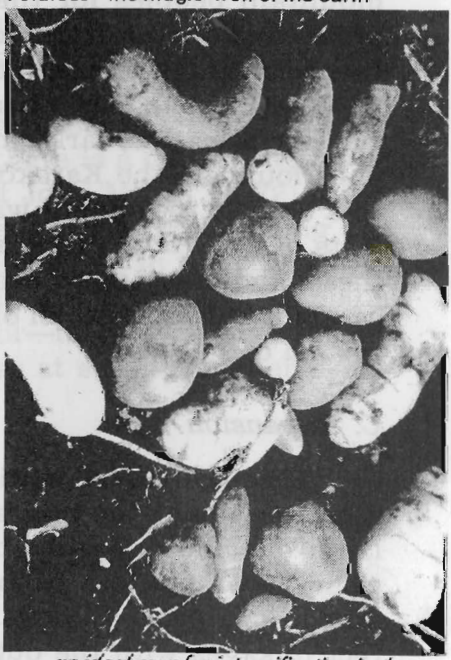
Despite predictions of increasing populations and the erosion of appropriate traditional institutions that formerly handled demographic pressure, historical analyses of mountain peoples indicate that they are particularly adept at regulating both population and communal management of resources. In a study of 500 years of change in Törbel, Switzerland, Netting (1976; 1981) noted that various regulatory mechanisms were used to keep the population at an acceptable level: by reduction of the birthrate, by keeping select family members celibate through entry into monasteries or nunneries, or simply by institutionalised bachelorhood and spinsterhood. Similar patterns have been noted among the *Sherpa* and other high altitude groups in Nepal, Tibet, and Bhutan and may account for special marriage forms such as polyandry (Fürer-Haimendorf 1964; 1979; Stevens 1993). Likewise, inheritance patterns in mountain communities have often guaranteed that land is not further divided but remains intact under the control of the family unit. Mountain communities the world over are famous for their community regulation of village lands and forests, unless this is interfered with by outside government agencies. Every year, a community leader is elected from among the households on a

rotating basis, thus spreading the democratic responsibility among all members. In addition, a local person is elected who has the responsibility to police the forest and the village commons. Strict guidelines are set down concerning how many animals can be pastured on the communal pastures and when wood can be taken from the community forests. Violators are fined and publicly humiliated. In the Andes, probably for crop disease control and productivity, an annual meeting is held to decide which fields (controlled by individual families) are to be cultivated in the complex rotational system of the community. Unfortunately, many government programmes (establishing national parks, nationalising forests, settling nomads, etc) have disrupted these traditional regulatory institutions. Despite pronouncements of their demise, however, such traditional institutions are alive and well and continue to resist misplaced government planning (Stevens 1993).

B. Intensification

Another strategy adopted by mountain peoples is that of intensifying their production systems when population stress creates tensions for the community. This can be done through adoption of new technologies or completely new management systems. The literature is rich with documented cases of the technological innovativeness of mountain farmers. History shows they are always bringing back new seeds and animals from their travels abroad (Rhoades 1985). They have ingeniously designed irrigation and terracing systems which allow further intensification. The very fact that

Potatoes - the magic 'fruit of the earth'



..... an ideal crop for intensification in the mountains .....

mountain farmers in the Andes, Zagros-Taurus Arc, and Eurasian mountains (including the HKH) domesticated most of the major food crops which provide 80 per cent of the calorific intake of humanity today is a striking example of mountain farmers' creativity. One of these crops—the potato—has been used by mountain peoples all over the globe to intensify their food output and security. It is speculated by some anthropologists that it was the potato's introduction into the northern regions of the Himalayan range of Nepal that brought the people out of relative poverty in the 19th Century and allowed the establishment of rich religious cultures associated with Buddhism (Fürer-Haimendorf 1979; Stevens 1993). A similar impetus is now being experienced in parts of Bhutan, thanks to the introduction of the potato during the past 30 years. The potato is an ideal crop for intensification in the mountains, since it yields more food per unit area and time than any other crop and thrives in the cold highland climates. In the case of the Alps, intensive systems of vertical, layered production of potatoes developed in times of food shortage. Also, the engineering feats of mountain peoples for the purpose of intensifying food production are unparalleled in the world: witness the elaborate terracing systems of the Andes, Himalayas, and even parts of SE Asia, e.g., those among the Ifugao with their rice terraces. Similarly, irrigation systems—such as the ones found in the Karakoram Himalayan region—testify to a skill of reclaiming waste land on a par with similar feats of the Dutch in reclaiming land from the sea. All of these, and many other examples, illustrate that intensification is part and parcel of the historic, highland cultural system of survival.

C. Expansion

Although recent writings by scientists and planners seem to lament the migration of mountain peoples as a latter day and undesired phenomenon, it should be made clear that mountain people have never been content to stay in one place. Survival in the mountains requires direct linkages with the outside through migration, trade, and exchange. Although mountain peoples bear a strong

sense of loyalty to a mountain region and return home regularly, one of the main strategies for mountain survival has either been expansion to another zone in the mountains or to the lowlands on a seasonal basis. This strategy again relates to the fact that the specialised mountain environment by itself has never been sufficient to support a population, particularly during seasons of food shortage or stress. Therefore, on a regular basis, migrants are sent from the village (generally the young, male and female, able-bodied) to seek work in the lowlands. This work is porterage, service in the armies of other nations as mercenaries, domestics, or engagement in long-distance trade and commerce (see Messerschmidt and Gurung 1973 for a fascinating comparison of Gurung and Thakali Subba traders). Today, for example, it is not uncommon to see traditional village women from Otavalo, Ecuador, travelling in Europe where they sell their wares on a seasonal basis. They come from isolated mountain villages in the Andes; they travel on jet airplanes with their passports, visa cards, and travellers' checks, but without losing any sense of their mountain ethnic identity. Income from these activities is often invested back into the resource base and agricultural productivity. Diversification through expansion can also mean, in some cases, that people are less dependent on the land, leading to less land degradation, and thereby preservation of the environment. Similarly, whenever there is a chance, highland communities will practise what John Murra (1972) called ***verticality control*** of several ecological levels along the mountain gradient. This may entail, as in the case of the historic *Inca*, actually sending out colonisers to claim new lands in the lower areas or—more typically—the establishment of off-shoot villages at slightly higher elevations or in lower zones.

D. Diversification

Mountain agricultural economies are typically highly diversified, both economically and ecologically. This phenomenon again grows out of the special demands of the mountain environment in which rarely a single zone or a single activity will supply all of the needs of a population.

Mountain people also know that life is precarious and that, in the unpredictable mountain world, a natural or social calamity can wipe out any single crop or activity. As a result, fields are fragmented, scattered across the toposequence, and planted with a great diversity of crops at different times (see scheduling, below). Mountain communities use diversity to increase incomes, but diversity is also a way to manage risk and to cope with scarcity and uncertainty. Diversification and expansion are parallel strategies (Fricke 1993).

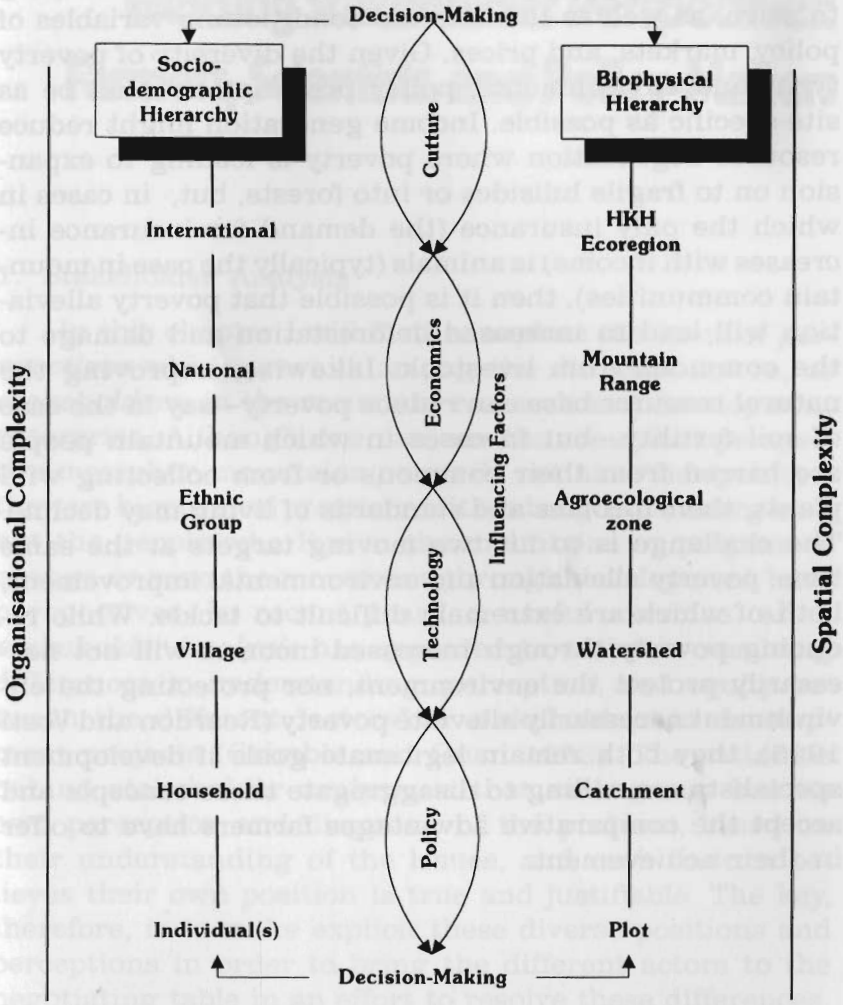
E. Scheduling

This strategy is related to the importance of seasonality and verticality/fragmentation in the mountain food and labour systems. Effectively, different altitudes and ecozones are planted and harvested at different times of the year to allow an efficient allocation of resources and labour. Likewise, animals are moved at key times to guarantee the most efficient use of pastures and fertilizer. Depending on the mountain environment (e.g., alpine, subtropical, tropical), different activities are scheduled around the seasons (see ***Expansion***, page 92)

5. Implication of the Integrated Approach for Policy

One effective approach to reducing poverty and improving the environmental resource base at the same time is to comprehend and influence decision-making at all levels on the mountain scale hierarchy. Unfortunately, as was pointed out in Chapter 5, a great deal of confusion prevails about scale. Figure 7 (page 95) illustrates the decision-making units and their connections with the biophysical levels. Ideally, this integrated approach will include an analysis of the ways and reasons different assets and resources are combined and used within the historical-cultural framework of mountain strategies. When this analysis is carried out well, which of the components are missing will be clearer (demand side markets, infrastructure, technologies, capital, or labour). Policy should aim at pinpointing what is driving behaviour and look for ways to change decision-making that does not contribute

Figure 7: Decision-making Hierarchy: Hindu Kush-Himalayan Agricultural System



to productivity and improvement of the resource base in order to assist people to achieve their cultural and economic objectives. In Chapter 8, I will return to this approach and look at how practitioners can work at the grass roots' level to identify decision-making in relation to assets and resources.

One important policy implication is that poverty alleviation alone may not be either a necessary or a sufficient

cause for redressing environmental problems. Whether it will or not in a given setting depends on the kind of poverty and type of environmental problem one is trying to solve, as well as the external conditioning variables of policy, markets, and prices. Given the diversity of poverty types and environments, policy prescription must be as site-specific as possible. Income generation might reduce resource degradation where poverty is leading to expansion on to fragile hillsides or into forests, but, in cases in which the only insurance (the demand for insurance increases with income) is animals (typically the case in mountain communities), then it is possible that poverty alleviation will lead to increased deforestation and damage to the commons from livestock. Likewise, improving the natural resource base can reduce poverty—say in the case of soil fertility—but in cases in which mountain people are barred from their commons or from collecting wild plants, their incomes and standards of living may decline. The challenge is to hit two moving targets at the same time: poverty alleviation and environmental improvement, both of which are extremely difficult to tackle. While reducing poverty through increased incomes will not necessarily protect the environment, nor protecting the environment necessarily alleviate poverty (Reardon and Vosti 1995), they both remain legitimate goals if development specialists are willing to disaggregate these concepts and accept the comparative advantages farmers have to offer in their achievement.