CHAPTER 3
Contextualising Sustainability for Mountain Agriculture

1. Sustainability from Whose Point of View?

Since sustainability as a development concept burst on to the international scene in the late 1980s, scholars, administrators, and policy-makers alike have struggled with precision of definition (Conway and Barbier 1990). From all possible academic and political angles the concept has been dissected, scrutinised, and emotionally debated. Most practitioners now accept that searching for the ultimate essence of sustainability or even unsustainability is much like the search for the Holy Grail in the Christian religion. It is an endless search which, in the end, often comes down as much to personal objectives and biases as to conceptual clarity. At the level of slogans and politics, sustainability is valuable just to remind governments that short-run production may undermine long-term production unless they are careful how the environment is treated. Social scientists, on the other hand, have argued that the concept should encompass more than myopic economics and production and must also be seen in terms of culture and quality of life. Ecologists, in turn, are concerned with ecosystemic functioning as their priority, often leaving people out altogether. When it comes to mountain development, most discussions of sustainabililty fall into the same trap of failure to distinguish from whose point of view—scientists, policy-makers, farmers, or other professionals—the term is being defined or operationalised. Three basic concepts (regardless of the specific content) are common today in sustainable development circles: the ***motherhood***; ***hard***; and ***soft*** definitions.

A. Motherhood Statements

On the most general level, and the one normally used by international agencies or even by national governments, the concept is more philosophical and normative than scientific. The UNCED 'Bruntland Report' (WCED 1987) is typical: "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*" The term is frequently displayed at this level on conference banners at luxury hotel conference centres, advertising diverse objectives: sustainable agriculture, sustainable development, sustainable livelihoods, sustainable tourism, sustainable energy, and sustainable environment. At this political level, sustainability is little more than a powerful symbol to remind governments and change agents of the limitations to growth and that production and the environment are two sides of the same coin. For science and planning, this concept has no utility. Castillo (1992), moreover, has warned that overly ambitious definitions will lead to disillusionment with sustainable agriculture, as was the case with the Green Revolution, because we are demanding that it also includes, in addition to food or ecological system goals, societal values, such as justice and economic equity.

B. Scientific and System-specific Definitions: Hard System

At the other extreme, scientists in particular need to define sustainability in a pragmatic way to operationalise and measure the concept. This has been called the ***hard system*** definition (Rölling 1994a and 1994b). Essentially, they wish to discover: how do we empirically know if we are obtaining this thing called sustainability? The requirements of scientific research necessitate moving away from vague statements to more rigorous boundaries amenable to precise empirical measurement. Driven by donor demands, the attempt is often to build a concept that encompasses some of the motherhood (gender, poverty alleviation) issues but which can still be measured in the field using conventional instruments. Essentially, many

scientific definitions are acceptable as long as they are logical, defined in time and space, and related back to the investigator's interest. For example, Izac and Swift (1994) argue that an agroecosystem is sustainable when, over a period of a decade or more, the annual yield of agricultural production shows a non-declining trend at a mean level to satisfy the nutritional and economic basic needs of the farmer and community. Their preferred scale of analysis is the community-catchment level. Short-run fluctuations are acceptable as long as the long-term trends are met. The basic scientific strategy is to start with the minimum number of components and assumptions and build from there towards a concept measurable in the field. While Izac and Swift (1994) do not find agroecosystemic concepts (stability, equity, productivity, and autonomy) very useful, these same concepts form a central part of the definition of sustainability of other scientists interested in similar questions (Conway 1987; Conway 1994). From whichever definition, ***hard systems*** require that the scientist define the set of interactive and measurable attributes and therein spatial and temporal boundaries (ecological, cultural, and economic). This approach, in particular, has stimulated a search for indicators of sustainability or its obverse unsustainability.

Several authors (Lynam and Herdt 1992) have argued that it is at the level of farming systems where biological, economic, and social considerations are integrated and households (and sometimes community and supra-community societies) make crucial decisions about the exact distribution and allocation of resources between different components. These allocating decisions about human, natural, and financial resources in mountainous areas typically involve the transfer of energy and nutrients between short- and long-distance zones. For example, a mountain farmer strat-

Yaks - *D. Miller*

..... yak ..... dung helps improve soil fertility.

egy for improving soil fertility may involve utilising residues from wheat fields near the village, bringing them down from the high pastures and coralling cattle, or purchasing fertilizer from a distant market. Such multi-level decisions, along with many others related to terracing, irrigation, tillage, and mechanisation, are part of the decision-making required by complex, vertically-layered mountain farming systems. The decision to use one technique rather than another must be set against the value of resource use for other competing uses.

In mountain areas, in particular, farming involves a complex integration of fields and resources scattered at different altitudinal levels, sometimes literally days' walk apart. Mountain farmers are concerned with the overall performance of the full system not just with what is happening in one zone or one field. Such complex decision-making can be bothersome to the scientist or planner who is interested in only one component, say a crop or soil type, or in ***closed systems***. It may be perfectly acceptable to the farmer for one set of fields to be deteriorating for a time, as long as the overall productivity is positive. In addition, mountain fields are usually scattered across a landscape involving a mix of individual and communal ownership. Those lands under community control are likewise managed in harmony with other sets of fields lying above and below the community in question.

One inescapable problem for the generalising hard system scientist in the HKH is the issue, as outlined by Thompson and Warburton (1985), of ***uncertainty*** of research findings. The complexity and unclear causal chain of land degradation have generated a vast scientific literature in which the results are so messy and contradictory that it is virtually impossible to tell who is 'right'. Studies, for example, on the per capita rate of fuelwood consumption in Nepal vary by a factor of 67. This makes generalisation across the region difficult, if not impossible. While Thompson and Warburton (1985) find the institutional motives for generating such divergent findings of central importance for researchers and planners, the question remains as to how the concept of sustainability in the ***hard system*** sense will have meaning beyond a specific catchment or watershed. Generalising about prob-

lems and solutions, even in the meso-range, may be the biggest challenge to agricultural development in the HKH.

C. Sustainability from the People's Point of View: Soft Systems

While scientists need an operationalised definition of sustainability, such definitions should not be confused with what local mountain farmers actually see as problems, potentialities, or long-term goals (Rölling 1991; 1994a; 1994b). Ethnoecology, an emerging area linking ethnoscience and ecology, would argue that perception of the environment, components of the environment, and even problems are dependent on the observer (i.e., whether the same plant is a weed or a crop depends on the culture). Different categories of people (ethnicity, gender, social class) have different understandings (or perceptions) because they actually perceive reality differently (Nazarea in press a and b). Therefore, 'goals' such as productivity and sustainability are objectives of people or institutions, not embedded in natural systems as some scientists seem to believe. This is the essence of the so-called ***soft systems*** which consider reality to be a mental construct of human actors (Rölling 1990; 1994a; 1994b). The varied 'points of view' between folk and scientific understandings are sometimes difficult to reconcile. Yet, understanding that there are differences teaches us that indicators of unsustainability are relevant only if related to whom they have meaning and the social context within time and space. For example, mining the soil is not necessarily an unsustainable act to farmers exploiting the land, although erosion always appears first on a list of unsustainability ***indicators*** for soil scientists. If the returns from mining the soil (i.e., farming) are used to educate the mountain farmer's children which, in turn, will help the family get out of farming and allow the land to become fallow, then "erosion" may be an "indicator" of sustainability (Reardon and Vosti 1995).

The Himalayan region is characterised by an extraordinary diversity of institutions and cultures, each with their own viewpoints and, hence, problem definitions. Furer-Heimendorf (1975) outlined, for example, the cog-

nitive and behavioural dichotomy separating the Hindu "cautious cultivator" who equates wealth with land and the Buddhist "adventurous traders" who do not share the land ethic. This cultural axis is also divided along the physical axis of upstream and downstream; and even within these divisions, as there are literally dozens of ethnic groups whose own 'perceptual' understandings vary according to social and physical location. In part, the great divergence in problem definitions throughout the region reflects this diversity and the localised contexts. The challenge, of course, is not to homogenise this diversity or the perceptions but to understand them and tap into them for appropriate planning, policies, and implementation of sustainable solutions.

D. Sustainability as Means and Ends

Many definitions of sustainability actually are desired institutional or project "targets" or "goals" of sustainability (increased options, quality of life, intergenerational equity, and livelihood security), not the process by which they are achieved (Jodha 1990). ICIMOD, for example, entertained three major yardsticks: i) decline in quality and range of options; ii) increased degree of desperation; and iii) reduced level of flexibility. ICIMOD settled on the first of these achievements and defined unsustainability as "*a decline in the quality and range of options that are related to production, consumption, and welfare of the community.*" This definition carries quantifiable sociocultural (quality of life), economic (enhanced welfare of the community), and agroecological dimensions (constancy of or improved natural resource base). With such sustainability targets, it is then feasible to select indicators and measure them at two points in time (e.g., ten-year intervals) and see if, according to the indicators, progress is occurring. However, this definition is derived from the "outsider point of view" and is not necessarily the same definition local people would give as their livelihood goals. In terms of the improved quality of life, for instance, the definition is purely material (food, shelter, clothing, education, and health), and all references to culture, cosmovision, spirituality, sense of place, and reli-

gion are left out, despite their paramount importance to mountain peoples. Chambers (1988) has noted that it is the 'enlightened rich' who give priority to sustainability, while the poor are often largely concerned with their immediate livelihoods. I also contend they are not merely obsessed with the material conditioning of life but with their cultural place within existence as well.

2. Sustainability as Process and Capacity

Despite these concerns with ICIMOD's definition, the notions of increasing quality and quantity of options are important to true structural development, as opposed to superficial modernisation. The structural development takes into account the question of whether opportunities (income generation, market alternatives, employment) will exist for mountain people as economic and environmental changes occur. A corollary of this idea is to view sustainability as the building of the local capacity/capability to respond to uncertain future change. What institutional arrangements are required to support the capacity of a society to meet unpredictable events and emerge with at least the same set of options as before? Can a community, for example, mobilise resources and skills to recover quickly from a devasting drought or to collapse in the prices of their main market crop (Ives and Messerli 1989)? In this view, sustainability is not defined by indicators (relevant to biological scientists and at points in time) but by the ability/capacity of real people to diagnose problems and seek solutions either internally or externally.

The above discussion can be summarised by looking at a hypothetical watershed project in the mid-hills of Nepal. The soil scientist examines a catchment, sees erosion, and, in fact, precisely measures "x" tons of soil loss at some point along the gradient. The economists discover seasonal food insecurity through household surveys, while the forester observes deforestation, two more ***hard system indicators*** of unsustainability. The standard development solution has been to attack each of these (even if the scientists are talking to each other) using technical solutions (SALT, high-value crops, re-seeding).

This "outside technology" approach may in fact be accompanied by a participatory approach which fosters the local capacity to make linkages, receive information, and act to solve problems. Policy-makers and planners may provide price support or credit. Yet, despite all of these inputs, the local people will be the final judges of how their watershed is managed. They will face day-to-day realities long after the project has departed. Outside expertise cannot replace local initiative, but might complement it. In this view, sustainability is therefore a long-term process; that of creating the capacity to solve problems and increase options in the ICIMOD spirit of sustainability (see Chapter 8 for a more detailed discussion of community-based mountain agricultural development).

3. Temporal Dimensions of Sustainability

As illustrated in Chapter 2 (Table 1), sustainable agriculture requires that researchers and planners work in timeframes of decades instead of annual cropping cycles. Two additional time considerations—in addition to seasonal monsoon climate variations—are typically overlooked in the sustainability debate (Greenland et al. 1995).

First, degradation of the physical environment (e.g., soil or biodiversity) may occur so gradually that each generation only glimpses part of the historic change. The outcome is not predictable or even of immediate concern to each generation. Slowly, people adapt to the negative processes, which in turn may accelerate further degradation until an irreversable condition evolves. Also, the time visions of local populations may not be at all in sync with the "log frames" and "time lines" of agricultural development projects. In fact, local farmers and development specialists are likely living in different temporal realities. These perceptual aspects of sustainability and environmental change in the mountains have not been researched in any depth (see Greenberg [n.d.] for some speculation on the issue in India's Western Himalayas).

Second, many mountain communities place a high value on intergenerational equity or ***bequeath value***. Closed corporate communities of the Himalayas, Andes, and the Alps often prohibit outsiders from purchasing

land to keep all future control in the hands of the village council. There is a strong ***sense of place*** and farm households expect generational continuity into the future. In these circumstances, there is an awareness of the value of the homeland, which must be protected by community controls over individual behaviour. Andean Indian communities, for instance, carefully regulate, through village assemblies, the rotation of land parcels, the use of commercial pastures, the cleaning and maintenance of irrigation channels, herd size, and even types of crops planted (Rhoades and Thompson 1975). External exploitation of land is limited, since only members of the community have inheritance rights to land. Similar patterns exist among the Sherpa and other high Himalayan agropastoral groups (Fürer-Haimendorf 1964; Rhoades and Thompson 1975). Problems in these systems arise as the penetration of commercial markets stimulates breakdown of traditional land-use systems; although the degree to which this has happened should not be assumed but investigated (Douglas 1993; DANIDA 1989).

In mountain development, the importance of cultural scripts—particularly those of the community—has been underplayed and underestimated by outside specialists. Farming in the mountains is more than just a manipulation of inputs, outputs, and natural phenomena and mountain farmers are more than just knee-jerk, economic-agronomic people at work. Mountain folk are enmeshed in great cultural traditions in which weddings, births, deaths, and many other rituals are central to their existence and give meaning to their lives. These activities require attention, time, and resources as well (often agricultural decisions are made because of the need to pay for these rites of passage).

4. Scaling the Sustainability of Mountain Agriculture

Sustainability, even if defined precisely in ***hard systems***, must be linked to a specific level of spatial analysis before it has any meaning in the mountain context. In the next chapter, I will suggest an integrated approach to a hierarchical level analysis for the HKH, as a first step in mediating between the macro- and micro-definitions of

problems. The definition or significance of the concept for the level of the trans-National HKH Ecoregion will be entirely different from that of the catchment, or farming system, level, in both social and biological dimensions. At the international level, for instance, an inter-governmental concern with transborder issues (flooding, siltation, water flows, population movements, mountain trade) prevails. These societal sustainability questions and their boundary issues are likely of little concern to individual farmers or their communities. Their perceptions and problem definitions are largely confined to their own farming and marketing territority (I hesitate to use the term watershed, since farmers do not live or farm the way water flows). For farmers, sustainability will only have meaning within their physical space and planning horizon. As one moves to other levels of the socio-demographic (ethnic associations, provincial districts) or spatial levels (catchment, watersheds), new definitions of sustainability should apply. Therefore, not only must sustainability be contextualised but so also must any action, development plan, or policy. This is the essence of integration, for it addresses the constant confusion over what level and whose sustainability concerns are being addressed. The scale and hierarchy issues of sustainability will be discussed in the next chapter.

5. Conclusion

In this chapter, I have addressed a number of sustainability issues relevant to the Hindu Kush-Himalayan Region, based on the many studies undertaken by the ICIMOD researchers and independent mountain scholars since the first major conference on the subject was held in 1990 (Jodha, Banskota, and Partap 1992). At that time, sustainability was a relatively new concept on the development scene, and I was unsure how it related to, for example, concepts of ***integrated mountain development***. Today, some six years later, we have a much clearer picture. Sustainability is a normative concept based on the values and perceptions of the user of the term, but a powerful one which redefines agricultural development itself. It is clear, I hope, from this analysis that sustainability

has potential meaning for all actors in the mountains and, in some aspect or another, is a practical goal. Villagers may not use a term like sustainability, but often they have cosmovisions and folk ideologies which—like the North American Iroquois Indians who always thought ahead seven generations before they made a council decision—have ***bequeath value*** for future generations. In this regard, I disagree with Chambers (1988) who sees it only as a concept of the rich.