

be adapted to support the poor's own livelihood strategies, as they are observed in different settings. On occasions, this may involve patterns that are more, rather than less, widely applicable, but this is not a prior requirement. On occasion, it may mean that support directed to rising farm productivity is the most promising route to poverty reduction, but again, this outcome is dependent on first reaching an understanding of the strategies of the poor in a particular locality, not from the imposition of a prior blueprint.

## — CHAPTER 6 —

# Environment and Sustainability

This chapter considers the relationship between rural livelihoods, diversification and the environment in developing countries. For this purpose, the environment is taken to mean the land, water and vegetation assets that are utilised either directly or indirectly to provide means of survival for human populations. The chapter is not concerned with urban and industrial environmental problems that are mainly about waste disposal and pollution. Nor is it concerned with the behaviour of natural ecosystems in the absence of human disturbances. It touches only lightly on global environmental issues such as large-scale deforestation or loss of biodiversity.

Environmental resources that are utilised by rural populations can be broadly categorised between those that are gathered, such as non-food forest products, wild fruits and vegetables, medicinal plants and so on, and those that are organised by human agency to produce managed outputs as in pastoral and farming systems. However, there does not exist in practice a neat separation between resources that are managed and those that are not; rather there is a continuum between intensive resource management at one end of a spectrum and minimal management at the other. It is rare for there to be literally no human management at all, for one of the features of rural communities is that everyone knows what everyone else does, so that socially undesirable resource extraction does not pass unnoticed. Nevertheless, customary means of regulating the use of certain resources may break down due to exogenous events or trends, and it is then that some of the problems associated with adverse resource trends tend to arise.

The topic of environment and rural livelihoods is a vast one on which an enormous amount has been written during the past two decades. For this reason, it is necessary to be rather selective regarding the aspects that seem to be most central to the topics of livelihoods and diversification. The chapter examines three such aspects, and then draws together the threads between them with a view to providing an overview of the current state of knowledge in this area. The next section considers, first, the relationship between rural poverty and the environment, a contentious area of enquiry displaying marked differences of interpretation concerning causes and effects. This is followed, second, by an examination of the concept of sustainability in a livelihood context, arriving eventually at a definition and discussion of the notion of sustainable rural

livelihoods. The third aspect of livelihood diversification and the environment treated here is that of resource management institutions, specifically the tenure regimes that determine the access to and ownership of environmental resources by rural households. The chapter concludes with an attempt to set out the balance of current thinking in this area.

### Poverty and environment interactions

A prevalent view in the decade from the mid-1980s to the mid-1990s was that poverty and environmental degradation were intimately connected, so that poverty was seen as both a cause and an effect of natural resource depletion, in a downward spiral (e.g. Leonard, 1989). An early statement of this view captures the line of thinking that it involves: 'Those who are poor and hungry will often destroy their immediate environment in order to survive: they will cut down forests; their livestock will overgraze grasslands; they will over use marginal land; and in growing numbers they will crowd into congested cities. The cumulative effect of these changes is so far-reaching as to make poverty itself a major global scourge' (Brundtland, 1987: 28). Alternatively, and more succinctly: 'The relationship between poverty and environmental degradation is close and complicated, with a built-in potential for escalation.' (Pinstrup-Andersen and Pandya-Lorch, 1994: 8).

The rationales for an adverse poverty-environment connection have been spelt out in numerous documents (Leonard, 1989; World Bank, 1992). Population growth is seen as a critical factor because it diminishes farm sizes in densely settled areas, results in a growing class of dispossessed rural dwellers, and creates pressure for people to push into marginal zones that cannot sustain permanent cultivation. It also directly increases the rate of extraction of environmental goods such as firewood, building materials, and fodder for animals. Lack of land as an asset means that the rural poor tend to display a higher reliance on gathering activities from the environment than do those rural dwellers who are able to meet their subsistence needs mainly from own-account farming (Jodha, 1990). The same combination of increasing population density and landlessness causes the cultivation by the poor of steep slopes, accelerating soil erosion, and the prevalence of 'slash-and-burn' conversion of land to farming at the forest fringe.

The downward spiral occurs because environmental degradation such as soil erosion, over-grazed pastures, and loss of watershed protection further intensifies the degree of poverty experienced by marginal groups, and drives them to ever more intensive exploitation of the resources that are accessible to them. Important in these explanations is a purported 'survival calculus' of poor families that are on the brink of destitution, in which desperation leads them to consume the capital that could form the basis of future survival because no other

choices are available to them. In addition, property regimes are sometimes cited as having key significance. The poor tend to move into areas where neither modern legal nor customary property institutions are operative, and they are therefore purported to behave in the mode of open access resources where the collective effect of each individual effort to survive results in overall unsustainable use of the resource in question. The lack of a stake in land occupied with no legal title or recognised tenancy further reinforces the adoption of perspectives prioritising short-term extractive rather than a long-term investment viewpoint.

Several conclusions arise from this interpretation of rural poverty and environmental change. One is that damage to local environments cannot be effectively halted unless poverty itself is addressed. This in turn requires a pace and pattern of economic growth that includes the poor, and a labour-intensive pattern of growth is the strategy advocated to achieve this goal (World Bank, 1990; 1992). Other elements of the 1990s poverty agenda discussed in Chapter 4 are also considered to make valuable contributions in this regard. The critical factor is to provide the poor with alternative sources of livelihood that reduce their reliance on gathering activities in the local environment, and diminish their motivation to initiate cultivation in environmentally sensitive locations. In this way, livelihood diversification appears on the scene as a potential solution to the poverty-environment trap. Changes in property regimes are also advocated, especially regularising the ownership or tenancy status of settlers in frontier areas or on marginal lands where legal ownership often rests with the state.

There are many writers, however, who regard the adverse poverty-environment proposition as a highly selective and therefore misleading interpretation of environmental change (e.g. Duraiappah, 1998). The problem is partly one of focus and scale (Broad, 1994; see also Box 6.1). By focusing attention at the micro level on the behaviour of the rural poor in pursuit of their livelihoods, the interpretation fails to capture the large-scale disturbances that set off new patterns of behaviour at local levels. Such large-scale events include timber concessions that are accompanied by sudden, unprecedented changes in road access into previously inaccessible forests; deliberate policies of new frontier settlement and transmigration carried out by governments and donor agencies in order to satisfy domestic pressure groups or for other, primarily political, reasons associated with control over national territory; enforced relocation of rural inhabitants for dams and hydroelectric schemes; alienation of land to ranches, estates, plantations and national parks; diversion of rivers for irrigation schemes, and so on. The large-scale effects that events such as these have on ecosystems and rural livelihoods dwarf the trivial, even in the aggregate, effects that individual action might have on natural resource systems in the absence of such disturbances. In other words, making the poor the scapegoat for environmental deterioration merely lets off the hook the commercial and state behaviours responsible for the really big changes that result in switches in the dynamics of the interaction of people with local environments.

#### Box 6.1. The poor and the environment: a Philippines case-study

The paper from which this example is taken (Broad, 1994) sets out to challenge the 'poverty as the cause of environmental degradation' proposition, utilising fieldwork in rural communities across the Philippines undertaken in the period 1988-91. The author points to numerous documented instances worldwide in which the poor have been observed to protect the environment, for example, by replanting trees, opposing logging operations, fighting enclosure of communal lands, and seeking greater autonomy in community resource management. These grassroots actions often occur in opposition to large-scale environmental despoliation being contemplated or undertaken by commercial operators, typically licensed and supported by central governments.

Research was conducted across several sites in rural areas of the Philippines, a country characterised by severe poverty rates, significant ecosystem damage, and a highly organised civil society. The research found that large numbers of poor people in the areas studied had been transformed into environmental activists, and it sought to discover the preconditions for this activism to take root. These preconditions were found to reside both in people's relation to their ecosystems and in the state of civil society. Specifically:

- the survival capabilities of the poor are directly threatened by the environmental degradation;
- poor people have lived in the threatened area for some time, and regard themselves as having a permanent stake in the natural resource base there;
- civil society in the country is politicized and organised.

Examples from the Philippines are cited with respect to each of these preconditions. In a particular rural area of the island of Mindanao, for example, tenant farmers growing rice and maize experienced a steady decline over many years in the quantity and quality of their water resources, including seasonal drying up of water courses, flooding after rains, declining length of the rainy season and similar events. The villagers came to connect these events with the widespread commercial logging taking place in the watersheds surrounding their cultivated areas, and this resulted in three direct actions against commercial loggers: first, sitting down in front of logging trucks locally, then blockading trucks in the provincial capital, and, subsequently, staging a 'fast for the trees' in the capital city, Manila.

This and other examples revealed the importance of length of residence in a location for people to become involved in environmental protest; new migrants into threatened areas are unlikely to adopt the same viewpoint as

established residents, and may even contribute to the problem rather than work towards a solution. Also important is the variety and density of civil organisations such as unions, peasant associations, people's organisations, and non-governmental organisations (NGOs), in respect of which the Philippines had become richly endowed in the years preceding this research. For example, there were no less than 1,300 development NGOs operating in the Philippines in the early 1990s.

While the research identifies these three factors as critical in the Philippines case, the central point is that conditions can exist, or be facilitated to come into existence, that empower the poor themselves to protect the environmental resources on which they depend for survival.

Source: Broad (1994).

This counter argument brings some balance into the assessment of poverty-environment interactions. The highly visible environmental changes that greatly worry people in industrial countries, for example, the rate of deforestation in Borneo or the Amazon, have almost nothing to do with rural poverty in developing countries and a lot to do with power struggles over valuable resources (tropical timber, oil, valuable metals) between the large players in national and international business and government. Subsequently, the poor, along with others, may be found to exploit the new opportunities thus opened up for survival, but this hardly constitutes the basis for a general argument about the poor's custodianship of environmental resources. Where large-scale disruption to previous ecosystems has occurred, and where subsequent property rights are unclear or unenforceable, it is hardly surprising that a chain of irreversible environmental change is put in motion. Moreover, to the extent that the adverse argument depends on unusual examples at the fringes of normal behaviour, so, too, there are plenty of individual case-studies that offer the opposite evidence of poor rural people augmenting their environments in order to maintain and enhance their future survival capabilities (e.g. Tiffen *et al.*, 1994; Leach and Mearns, 1996; Mortimore, 1998).

Nor can inequality be ignored in any balanced assessment of links between poverty and the environment. The lack of assets of the rural poor is often a mirror image of the acquisition of assets by the rural rich, and the ownership of rural assets from land to crops, cattle, goats, and trees cannot be inferred by casual observation of rural habitats; absentee ownership of rural assets may sometimes be a significant feature of their misuse from a sustainability perspective.

These and related considerations have led researchers to advocate a more disaggregated approach to thinking through poverty-environment interactions which anticipate the livelihoods framework set out in Chapter 2. For example, Reardon and Vosti (1995) put forward a framework that seeks to distinguish

different types of poverty and different types of environmental change, as well as the links that occur between them. Poverty differs according to the type or combination of assets that the household has at its command, or in which it is deficit. A household may be well endowed in one asset, for example, human capital, and poorly endowed in another, for example, land; the opportunities for converting one type of asset into another can vary considerably. For example, if access to a renewable environmental resource (e.g. firewood) could be converted via the market into land or education, then reliance on the first asset would reduce over time. On the other hand, if no such opportunity for conversion or substitution exists, then reliance on the original asset will be intensified over time. The importance of reaching an understanding of the asset basis of livelihood systems, in the environmental context, has also been emphasised by other writers (e.g. Dasgupta and Maler, 1995), and is of course a central feature of the livelihoods approach that informs this book.

Livelihood diversification enters importantly into the poverty-environment equation because it can directly switch the time allocation of the household from gathering activities in the local environment to off-farm or non-farm income generating activities, and, indirectly, it can improve the ease with which the household can convert one type of asset into another. As discussed in Chapter 4, access to non-farm income depends on relatively high levels of the human capital asset comprising skills, education and good health. In turn this access makes possible future increases in human capital for family members, and facilitates investment either in farm productive capacity (Chapter 5 above) or non-farm activities. The poor have particularly strong incentives to diversify income because of seasonality, risk and associated reasons; yet they may be least able to do so due to poverty in the assets needed to secure diversification options.

### Economic factors and conservation

For natural resources that are under the direct management control of the farm family i.e. on-farm resources, the household economic model can provide some useful insights into the motives for conservation (Ellis, 1993). It is recalled that the general prediction of the household model is that labour time is allocated to different activities up to the point where the return to one more unit of time in an activity is equal to the opportunity value of labour, which is the market wage. Management of environmental resources brings a complication to this prediction because it involves a stream of costs and returns evolving over future time, rather than just a static comparison of returns to labour on and off the farm. For example, the decision whether to build a terrace to prevent soil erosion involves an interaction between the current opportunity cost of labour time and the expected future income gains from terracing.

A considerable proportion of resource conservation by farm households occurs as an intrinsic feature of farming systems, and is not separable from routine farming practices in terms of costs and returns. In ordinary circumstances farmers do not farm in ways that cause their yields to decline in successive years (Netting, 1993). Nevertheless, increased livelihood stress due, for example, to a severe downturn in the market price of the output of a cash crop, a labour shortage, or a civil breakdown, may result in the neglect of routine conservation practices.

Non-routine conservation activities are deterred if the true opportunity cost of labour to the household is high. This may occur for several reasons, for example, (1) when the labour market is not well developed locally, (2) when able-bodied household members migrate long distances for wage work, or (3) when inflexibility in the gender division of labour causes women to experience absolute constraints on their availability of time. Due to these factors, even in a low-income country with widespread unemployment, farm households in particular locations can confront a high effective cost of labour time, curtailing their capacity to divert labour from recurrent survival activities into conservation activities.

On the benefit side of conservation, several reasons are commonly identified as reducing the motivation of the household to carry out specific conservation measures. These include: (1) severe livelihood stress, that is, extreme poverty and proneness to destitution or starvation, which corresponds to the 'survival calculus' already mentioned earlier; (2) insecurity of land tenure, typically resulting not from failures of customary tenure, but from failures by the state to institute workable tenure arrangements in newly settled zones; (3) high uncertainty surrounding future returns, resulting perhaps from civil breakdown; (4) low level of perceived returns due to falling real prices; and (5) high degrees of instability in market prices for farm inputs and outputs causing unduly high risk.

The conjunction of one or more of these adverse circumstances results in households having what economists call a 'high rate of time preference'. This means that future income streams are heavily discounted compared with current income; in other words, the achievement of current consumption is given high priority relative to future consumption levels. Insecurity and uncertainty are critical factors causing a high rate of time preference. Conversely, when households exhibit a 'low rate of time preference', future income streams are discounted less in household decisions, and more effort is likely to be placed in conservation activities (Pearce *et al.*, 1990).

A costs and returns framework at household level helps to dispel preconceived ideas that surround the custodianship of natural resources by poor farmers. It is not true that the poor are intrinsically prone to despoil and degrade their natural environments. It is much more common to encounter poor farmers carrying out resource conservation measures, such as ridging, terracing, rotations, mixed cropping, tree planting, and so on, than the reverse. However, an

opposing mythology, that small farmers are always the good custodians of the environment, is not always true either. A variety of reasons arising out of markets or social dislocation can result in the balance of advantage being tipped in favour of neglecting conservation. It is evident that amongst the most significant of these is the withdrawal, erosion or decline of a stake in the future quality of the resource that is accessed or owned by the household. Institutional issues of land tenure and access to common property resources are important in this regard, and are examined below.

Livelihood diversification by rural households can evidently have different effects on local environments depending on the opportunities available and the strategies that are adopted to respond to those opportunities. In the livelihoods framework, this variability in cause and effect is to be expected. One trajectory is that growth of non-farm income sources, especially if accessible in remote rural areas, might reduce the need for landless rural dwellers to carry out extractive practices in local environments for their survival. This has been called the 'substitution of employment for the environment' and is quite a strong strand in the policy literature (e.g. Lipton, 1991). However, as discussed in Chapter 5, for settled agriculturalists it sometimes happens that the uptake of non-farm earning opportunities result in neglect of labour-intensive conservation practices due to the shortage of labour that ensues. An example of this is provided by Netting *et al.* (1989) in their discussion of different phases in the livelihood strategies of the Kofyar in Nigeria. Furthermore, in frontier areas, extensive methods of resource use (e.g. cattle ranching) are often adopted because land is extremely cheap compared to labour, and in such circumstances the availability of non-farm income earning opportunities may even reinforce rather than reduce the incentive to expand land holdings in order to undertake production on an extensive scale.

### Sustainability, livelihoods, and diversity

Sustainability is a widely utilised but problematic concept that recurs in discussions about environmental resources and human livelihoods. Such are the problems concerning its usage that one respectable economics source is moved to comment that 'it would be difficult to find another field of research endeavour in the social sciences that has displayed such intellectual regress' (Dasgupta and Maler, 1995: 2393). Difficulties with the concept of sustainability arise from its objectives (what is it that is deemed desirable to sustain?), the level or scale to which it applies (species, ecosystems, biological zones, social systems, the planet?), and its objective or subjective character (does it describe the objective conditions for the persistence of certain attributes, or desirable outcomes that ought to be promoted according to widely agreed subjective goals?). The following treatment traces a particular path through this maze with no claim to its superiority over any number of other possible paths, but with the intention of

arriving at some preliminary conclusions regarding the prevalent notion of sustainable rural livelihoods (D. Carney, 1998; Scoones 1998).

Sustainability attempts to convey continuity in the very long term of the capacity of a system to reproduce itself or expand over time. In an ecosystem context, this refers to biomass and species diversity, but in its application to human needs, it means sustaining outputs available for human consumption, and therefore the capacity of a resource or system to keep up the same or increase its contribution to human welfare and well-being. It is taken as obvious that this refers to a long-term trend, not to annual or cyclical variations around that trend. Variations around a trend describe a system's stability rather than its sustainability. In the ecological literature, the concept of resilience introduced in Chapter 3 above is an integral part of the larger notion of sustainability (Holling, 1973). Resilience refers to the capacity of the system to 'bounce back' in the context of stress or disturbance by natural events or human agency. Put another way, it means the system's ability to recuperate from natural and human perturbations (Altieri, 1995).

One scale to which the notion of sustainability has been applied is that of the human exploitation of renewable natural resources such as fisheries, forests, underground aquifers and so on. For example, the sustainable yield of a fishery might be defined as the annual catch that maximises long run output without causing an irreversible decline in the fish population. Likewise, the sustainable harvest of the rattan (used to make cane furniture) that grows wild in the forests of Borneo, is the level of harvest that allows plants to regenerate so that harvesting can be continued at the same or increased level in subsequent years. Used in this sense, it is clear that sustainability cannot apply to non-renewable resources like mineral deposits and oil reserves that are, by definition, depleted by human extraction.

Even at this apparently uncontroversial level, sustainability can soon run into difficulties of interpretation. This is because human agency causes indirect dynamic interactions in natural ecosystems with unforeseeable consequences. Harvesting of one resource (e.g. a particular type of fish) may result in large changes in the behaviour of allied species that exhibit complementary or predatory relations with the species being harvested. This may result in any one of a multiplicity of unknown outcomes such as, for example, larger catches of a different fish species also favoured in human consumption; the emergence to prominence of an inedible species; or the occurrence of a toxic plankton 'bloom' that kills a wide variety of living organisms in the surrounding lake or ocean.

More generally, sustainability specified in terms of the carrying capacity of natural resources has proved inaccurate as a description of the dynamic processes of adaptation and change that occur in ecosystems (Leach and Mearns, 1996). Carrying capacity presupposes equilibrium states for ecological or other systems to which deviations can be compared, for example, grass populations at sustainable levels of grazing compared with those associated with

overgrazing. The 'new ecology' no longer accepts the existence of these equilibrium states, and prefers to recognise that all ecosystems are in continuous processes of adaptation to the perturbations and shocks that they confront, with or without human action being implicated.

Moving away from the scale of a single renewable resource, an important strand of the sustainability literature has been concerned with farming systems, typically under the rubric of 'sustainable agriculture'. Some authors have interpreted this as being principally about achieving steady rises in farm productivity over time (e.g. Lynam and Herdt, 1992). This requires technical change and intensification of resource use, including the substitution of chemical for organic inputs. However, other authors would profoundly disagree with such a definition, being more concerned with the interaction of the farming system with the adjacent environment, and the deleterious side-effects of the growing use of pesticides, herbicides and fertilisers on farms. On this latter tack, sustainable agriculture is more closely associated with the move away from chemical inputs, and has its purest manifestation in the advocacy of organic farming. Yet another view of sustainable agriculture derives from the notion of farming as an agroecological system, within which resilience is enhanced by system diversity (Altieri, 1995).

At an even more aggregate scale, but still within the realm of human-environment interactions, sustainable development has been defined in terms of the living standards of future generations not being compromised through environmental depletion by the current generation (Brundtland, 1987: 43). This raises philosophical issues about the moral obligations of the current generation to future generations that are far from clear-cut (Tisdell, 1988; Pasek, 1992). It also provokes economic questions concerning inter-generational comparisons of material welfare that give rise to some scepticism about its value as a guide to economic policy (Beckerman, 1992). Related points are that (1) the current generation cannot prejudice the tastes and preferences of future generations; (2) technology is changing continuously so that the necessity for conserving some types of resource now may become irrelevant in the future; and (3) when economic growth is occurring future generations will have higher income, and therefore more options, than the current generation.

A refinement of the Brundtland definition is to consider the environment as a gigantic capital stock, and then to define sustainable development as development that ensures that this capital stock does not decline over time (Pearce *et al.*, 1989). Some economists concur with the idea of treating the environment as a capital stock, that is, as a set of natural assets to complement physical, human and social assets (Dasgupta and Maler, 1995), and this is the position also taken in the livelihoods approach of this book. However, they would point out that almost any conceivable development path involves substitution occurring within and between different asset categories, so that sustainable human development does not necessarily require sustainability of individual natural assets.

The foregoing approaches to sustainability share a common entry point which is that the concept should apply to objective, preferably measurable, processes and outcomes. This is so whether the scale is the single renewable resource, agroecological systems (Altieri, 1995), farming systems (Lynam and Herdt, 1992), or overall social and economic development (Pearce *et al.*, 1989). A different approach is to pose sustainable development as a set of desirable attributes of environmental and social change. Reed (1996), for example, defines sustainable development as improving the quality of human life while living within the carrying capacity of supporting ecosystems. 'This definition of sustainable development is a normative concept that embodies standards of judgement and behaviour to be respected as the human community seeks to satisfy its needs of survival and well-being.' (ibid., 33). Reed's definition has economic, social and environmental dimensions, and includes factors such as labour-intensive growth, distributional equity, gender equity, provision of social services, full valuation of natural resources in development projects, and limiting the consumption of renewable resources to their regenerative rates.

Some serious flaws in the concept of sustainability emerge from this partial review of its attributes at different scales of aggregation and across different horizontal ranges of natural and social change (see also Box 6.2). One unresolved difficulty is that sustainability becomes progressively more difficult to describe as scale increases, due to the changing balance of endogenous vs. exogenous influences on system dynamics. Thus, for farming systems, for example, it is one thing to describe the farm-level agronomic interactions leading to plant growth and crop yields as sustainable, but quite another to describe the entire farm sector, the national market for farm outputs, or the world market in agricultural commodities as sustainable (Lynam and Herdt, 1992). In addition, sustainability is not transferable across hierarchies of scale (Goldman, 1995). For example, the achievement of sustainability at the scale of maize production using organic methods is no guarantee of sustainability in the higher order scale of the livelihoods of maize farmers. Meanwhile, the subjective definitions of sustainable development on the large scale are susceptible to such wide variation in prioritisation and emphasis, according to changing popular views on a wide range of development topics, that they become practically vacuous for policy purposes.

The notion of 'sustainable rural livelihoods' emerges in part from ecological definitions of sustainability, and in part from economic and social development preoccupations with poverty, vulnerability and food security. On the ecological side, it is based on the definition by Conway (1985), that 'sustainability is the ability of a system to maintain productivity in spite of a major disturbance, such as is caused by intensive stress or a large perturbation.' This definition was originally applied to describing the sustainability of agroecological systems (Conway, 1985; 1987). It distinguishes two different types of threat to the maintenance of system productivity, namely stress, which is defined as 'a frequent, sometimes continuous, relatively small, predictable force having a large

cumulative effect', and shock, which is defined as 'a force that was relatively large and unpredictable' (Conway and Barbier, 1990).

The proximity of this terminology to ideas about livelihoods is immediately apparent. Livelihood systems likewise confront adverse trends and sudden shocks. Moreover, for poor rural people in remote locations, it may seem that these stresses and shocks coincide with those of the agroecological systems on which they depend for survival. Therefore, it is a relatively small step to define a sustainable livelihood as one that can cope with stress and shocks, and displays resilience when faced with adverse events. This is the definition of a sustainable livelihood found in several sources and already alluded to in the context of the livelihood definition given in Chapter 1 (Ahmed and Lipton, 1997; Scoones, 1998). In its favour, this definition has the virtue of being less ambitious than the all-embracing idea of sustainable development. It is also somewhat less susceptible to widely varying subjective interpretations, since describing the factors that enable rural households to maintain living standards in the presence of pressures and sudden shocks restricts the field of enquiry in some of its dimensions.

Diversity arises in several different branches of the sustainability literature, and is typically regarded as contributing to greater resilience. This is true, for example, of ecological interpretations of resilience in natural systems. Here, biological diversity permits complementarities between species in such processes as nutrient formation, nutrient uptake, and species reproduction; and, in addition, it confers reduced risk of irreversible ecosystem change from natural events such as frost or insect infestation. These same benefits recur with respect to farming systems in the agroecological literature (Altieri, 1995). Here, not only does crop specialisation greatly increase the susceptibility to disaster of monocrop production systems, but also intensive use of chemical inputs (fertilizers, herbicides, disease-control chemicals, pesticides) is required by monocrop systems in order to substitute for benefits that could have been achieved via system diversity. Note that varietal diversity does not necessarily prevent devastation of individual species by, for example, pests or disease; what it does do is contribute to system level resilience. This is a further example of non-transferability across scales of sustainability. Within a diverse system, an individual species or activity may not be sustainable while the sustainability of the system as a whole is assisted by diversity.

Following a similar line of reasoning, diverse livelihood systems might be expected to offer greater protection against erosion or catastrophe than undiverse ones. In this sense, livelihood diversification may be thought of as contributing positively to sustainable rural livelihoods. It is important to note, however, that non-transferability across scales of sustainability continues to apply. For a diverse rural livelihood to be sustainable it is not necessary for individual components of the livelihood to exhibit sustainability. For example, livelihood diversification that involves the migration of young, male labour to urban jobs

### Box 6.2. Stress, shocks and sustainability in African agriculture

A paper by Goldman (1995) provides a critical review of sustainability with particular emphasis on its meaning as applied to farming and livestock production systems in sub-Saharan Africa. An empirical approach to sustainability is advocated which seeks to identify factors and processes that enhance or threaten the sustainability of agricultural activities, yielding three basic questions (p. 298): (1) What are we trying to sustain? (2) How do we know whether something is or is not sustainable? (3) What are the main threats to sustainability for the things we want to sustain?

For the purpose of addressing these questions, a working definition of sustainability is adopted as 'the continuance or persistence of an identified quality, activity, or system over a given period of time' (p. 301)

Having explored this definition with respect to crop, livestock and larger socio-economic systems in Africa, Goldman arrives at two main conclusions. The first is that 'The things we want to sustain comprise a hierarchy of attributes, components, and systems at increasing scales' (p. 291), and, moreover, the sustainability of higher order systems is not necessarily dependent on sustaining lower order component sub-systems due to substitutions that more complex or large-scale systems are able to make. The second is that extreme perturbations (i.e. shocks) are a more important source of lack of sustainability than is recognised in the literature, while adverse trends (i.e. stress factors such as soil erosion) are much less important.

Investigation of the causes of major crop declines and disappearances was used to test the nature of threats to crop system sustainability. Evidence on such events examined in Nigeria and Kenya covered the decline or disappearance of 25 crops in five different rural locations. The three main causes of these declines were found to be pests and diseases; substitutions due to changes in economic circumstances; and, least significantly, declines in soil fertility or land shortage. In other words, shocks were found to be more important than adverse trends in the majority of cases.

Many crops disappeared because they were devastated by pest or disease outbreaks, for example root rot disease of cocoyams in West Africa and aphid attacks on cowpeas in eastern Kenya. Others disappeared due to economic substitution factors that are rarely given due credence in the sustainable agriculture literature, for example, responses by farmers to changes in domestic or export prices, and changing consumption preferences within farming communities themselves.

Livestock debates about sustainability have been permeated by the notion of carrying capacity, implying incremental processes by which the capacity of the environment to support livestock populations would deteriorate over time. However, an examination by Goldman of 17 major events or phases of

livestock decline in Africa during the twentieth century revealed that drought, famine, disease, locusts and civil wars (including ethnic conflicts and revolutions) were the principal reasons for drastic reductions in livestock numbers.

Goldman observes (p. 325) that 'The literature on sustainability and sustainable agriculture has focused on an increasingly holistic agenda of desirable objectives. Even if one concurs with the agenda, it is difficult to demonstrate that these desirable conditions have been functionally related to sustainability. Virtuous societies, admirable social attributes, and management systems that husband and conserve resources have not historically proven more sustainable than have less commendable societies, systems, or conditions. Neither have resource conserving practices necessarily conferred sustainability on human systems at a larger scale.'

Critically, most of the extreme events that have undermined sustainability 'had comparable effects on both well and poorly managed farms and on areas of both high and low land use stress' (p. 329). Moreover, 'household strategies to increase resilience [via diversifying income sources] may conflict with achievement of an optimal level of resource management'. It is important to acknowledge not just that this is what rural households are doing, but that this is an entirely sensible response 'given that the primary threat to survival of the household systems is from extreme events rather than from incremental resource or land degradation.'

may result in the abandonment of labour intensive forms of soil conservation such as terracing.

In the insightful study summarised in Box 6.2 above, Goldman (1995) examines crop-scale and livelihood-scale cases of system failure in sub-Saharan Africa, drawing on a wide range of empirical case-studies. The research leads to a rejection of the Conway and Barbier (1990) hypothesis that sustainability is comprised more by stress factors than by shocks. It is found that in almost all documented cases, the disappearance of crops from African farming systems was due to shock factors, principally pests, diseases, or sharp changes in relative market prices. Likewise, African rural livelihood failures are not due to the stress factors of resource degradation in soils, water, and rangeland. Rather, they are predominantly due to the shock factors of drought and civil strife, these two factors often coinciding to produce really catastrophic collapses in the livelihood strategies being followed up to that point.

It is probable that the capability of human populations to adapt to changes that occur gradually underlies these findings. The gradual deterioration of an individual livelihood component typically gives scope for substitutions to be made in resources, farm outputs or activities; whereas shocks do not permit such

a process of adaptation. This may have some important implications for rural poverty reduction policies, in that increasing the scope for adaptation is perhaps more important than trying to prevent, at least by outside agency, underlying slow changes in the quality of environmental resources. Concomitantly, safety nets need to be in place that can be mobilised quickly when large-scale shocks occur in livelihood systems.

## Resource management institutions and livelihoods

The discussion thus far has considered livelihood interactions with natural resources in the absence of the institutions that permit access to such resources. Institutions in this context mean the socially accepted rules that determine access to natural resources. Such rules may be written and formal, as for example, in the legally sanctioned ownership of private property, or in laws prohibiting the utilisation of certain resources (the outlawing of the ivory trade is an international example). Other rules may be customary but still relatively formal, such as the adjudication of land ownership disputes by village chiefs or councils. Still others may reflect socially acceptable behaviour, or its converse, deriving from belonging to rural communities. Institutions also include the rules of inheritance that can have a large impact on the evolution of access patterns to land over time.

Resource access institutions are important for describing rural livelihoods. Much writing in agricultural development appears to have in mind an ideal type of owner-occupier farmer, owning sufficient land for family survival, and, with technological progress, being able to increase living standards from farming alone. This stereotype is misleading on many counts, amongst which land tenure systems are certainly one. Private freehold tenure is prevalent in some regions (Asia, Latin America), but not in others (Africa). Where it exists, it is often associated with highly unequal land ownership structures, such that the majority of small farming households are agricultural tenants rather than owners. Where it does not exist in law, as in much of sub-Saharan Africa, *de facto* ownership deriving from well established local understandings of family and kinship rights over land is combined with a documented degree of flexibility over land access. In addition, common property is widely prevalent in developing countries, with collective access often overlapping and merging with private access in complex ways.

Research on land tenure and livelihoods in sub-Saharan Africa emphasises the significance of flexibility as an attribute permitting land access arrangements to adapt to changing pressures and circumstances in the rural economy (Shipton and Goheen, 1992). In this respect, it is usually inaccurate to portray land tenure as corresponding to fixed types of access, for example, private ownership or



common property. In many instances, even when private ownership is instituted in law as the formal mechanism of land ownership, flexibility of access is maintained by a proliferation of different tenancy arrangements. Where private ownership does not constitute the fundamental legal basis of ownership rights in land, as in much of sub-Saharan Africa, customary land access systems are characterised by their capability to adapt over time. Access to land for crop cultivation and grazing must then be seen as a process, evolving in a social context, and one that involves renegotiation between interested parties concerning rights of access, and reinterpretation of previous, current and future access patterns (Berry, 1997).

This flexibility is not only true of sub-Saharan Africa, although much of the writing that underscores it utilises African case-studies. Appearances often deceive where land access and ownership is concerned. For example, the densely populated island of Java in Indonesia appears to have a relatively egalitarian size structure of land holdings deriving originally from customary law and later inscribed in private ownership. The true picture differs from this, however, due to subsequent land purchases by mainly urban-based property owners. In practice, a highly complex array of tenancy arrangements abounds in the Javanese rural economy, including share cropping, sub-tenancy, pawning, labour contracts, and many other land access devices. These practices create a high degree of flexibility of land access on the small scale by rural dwellers, but they also obscure underlying patterns of land ownership, and they are prone to give a false impression of the asset status of the rural poor.

The point has been made with respect to sub-Saharan Africa that land is not very often interpreted by its users in a private ownership mode of thought. Land access is inextricably bound up with social affiliations that provide both the framework and the security of land utilisation for different purposes (Shipton and Goheen, 1992). These social affiliations may be extended resident families, kinship lineages, villages, chiefdoms, or ethnic groups. They may take the form of tightly knit local groups, or networks involving geographically extended links, or categories of people sharing common interests in the manner by which they obtain a livelihood. Land access often involves reciprocal obligations with respect to other aspects of livelihoods. For example, Toulmin (1992) shows how, in a village studied in rural Mali, a resident ethnic group, the Bambara, allow seasonal cattle grazing on village lands by another ethnic group, the Fulani, in a context in which the Bambara supply well water to the Fulani for their cattle in exchange for cattle dung which is used to fertilise the millet fields of the Bambara.

This type of unwritten interchange of resources, services and goods typifies rural livelihoods in rural sub-Saharan Africa and elsewhere. A common mistake of outsiders who observe such arrangements is to assume that they are fixed and 'traditional', and therefore likely to disintegrate when local pressures on land or external factors causes them no longer to function according to previous cus-

tom. However, such land access arrangements are seldom fixed in that sense; they come into being under circumstances that make it beneficial for all parties to comply with them, and they are modified or abandoned when they no longer fulfil the livelihood role which has resulted in their adoption in the first place. A process of adaptation takes place in which arrangements that no longer work very well are replaced by ones that work better under the changing circumstances that individuals and communities confront.

There exists an influential view that land rights must eventually gravitate towards private property in the process of social and economic change. One strand of this view is that a combination of population pressure and increased integration into markets results in the emergence of a land market and, therefore, *de facto* private property, even while customary tenure in theory prevails. Another strand is that the institution of private property is the only effective way of avoiding the problems of over-utilisation of land and other natural resources associated with common property (e.g. Demsetz, 1967). According to this way of thinking, private property ensures a private incentive to conserve resources and carry out environmentally sustainable land management practices. It also provides the security to encourage long-term investment in enhancing the productivity of land. In the absence of private property, these incentives are missing, and environmental deterioration inevitably takes place.

Many researchers have questioned the validity of these claims for the superiority of private property in efficiency and intertemporal conservation terms (see e.g. Platteau, 1996). It is pointed out that any type of property regime has to be socially acceptable in order to work in practice, otherwise rural social conflict will for certain negate any supposed efficiency advantages of land privatisation. There are several reasons for thinking that in the African context, private land titling and registration might prove disastrous for livelihoods, and have severely adverse consequences for poverty reduction and equity goals. Some of these reasons are that:

1. private titling would freeze land ownership patterns at the point of registration, thus removing the flexibility and adaptation that characterise customary tenure;
2. disputes over ownership and the legitimacy of title claims would be rife, and a long period of extreme uncertainty would ensue while claims were debated in the customary and legal dispute settlement systems;
3. land registration would inevitably involve dispossession of individuals and families that hold customary access as part of complex social interchanges, but that are not part of the core social group by which ownership subsequently comes to be defined;
4. the position of women as land users is particularly problematic in this respect, and dispossession of *de facto* women landholders would inevitably be widespread in the context of most African legal and customary hereditary systems;

5. land registration would without doubt exacerbate inequities of asset ownership and distribution: experiments in land titling have demonstrated unequivocally that the rich, the powerful, the educated, and the better-informed are those that are able to navigate the legal complexities of registration and are therefore those that are able to manipulate the registration process to their advantage;
6. the maintenance of land ownership records is a complex legal and administrative undertaking that is far beyond the capacity of already over-extended central and local administrations in Africa, and failures in recording ownership transfers, as also their falsification, would again tend to favour the advantaged over the disadvantaged in land ownership disputes.

There is evidence from Kenya, an African country that has private freehold title as its legal framework for land ownership, that freehold registration primarily affects land that had already been alienated from its customary access rights in the colonial period. This is land that was owned by white settler farmers, and has subsequently been purchased and sold in a freehold land market. In rural areas where land was not alienated historically in this way, registration of ownership title is seldom used as a device for recording changes in land access, and research reveals that land exchanges that are formally registered have a high likelihood of being misrecorded or unrecorded in the land registration archives (Platteau, 1996).

In a study undertaken in Ghana, Kenya and Rwanda, Place and Hazell (1993) investigated whether indigenous land rights systems inhibited the uptake of new technology in the form of greater land improvements, input use, access to credit, and crop yields. The authors discover that the widely varying land rights observed in rural areas of these countries did not have any explanatory power regarding the adoption of agricultural improvements. They therefore concluded that land registration and titling programmes should not be prioritised in rural development policy in sub-Saharan Africa.

The outcome of these and related considerations is that the blanket imposition of private freehold property, as advocated by some enthusiasts, is a flawed undertaking that underestimates the benefits of heterogeneity and misunderstands the adaptability of customary allocation procedures. It is widely agreed by researchers who do not accept the private property advocacy that customary access is not replicable by administrative command from above, and should be left well alone, except, perhaps, in collaborating with local level institutions to devise clearer and more timely methods for settling disputes.

Broadly similar arguments pertain in this context to common property resources. There is no unique way of defining common property as an institution, except that it is characterised as lying somewhere within the spectrum that runs from private ownership at one extreme to open access at the other. An earlier literature on the commons tended to confuse common property with open access, and to advocate the privatisation of common property resources due to a perceived in-built economic logic for commons to be over-exploited (Hardin, 1968;

Ellis, 1993: 262-270). Common property is not, however, an open access resource. It typically exists in the specific locational context of villages and rural communities, and it comprises the land, water, trees, grazing etc. which are regarded as within the purview of village-level decision-making but are not allocated to the use of individual families or households. Land as a resource may switch back and forth between individual and common property according to season and the use to which it is put.

Common property has been shown to play a disproportionately important role in the livelihoods of the landless rural poor, by providing them with access to resources to which they would otherwise be denied due to their landless status (Jodha, 1990). In many locations customary common property has been eroded by privatisation, rising population density, road construction and so on; however, there are many instances of it arising anew when local communities confront a problem of regulating access to a resource that is broadly beneficial to the community as a whole (e.g. Ostrom, 1990). The common property solution to local resource access problems can only arise in the context of power devolved to district and village levels; it is inhibited by centralised state authority, and common property does not lend itself to regulation according to inflexible administrative rules devised outside its local social context.

Land tenure and property regimes play critical roles in the interface between livelihoods and the environment. On the one hand, flexibility of access to land and other resources contributes to the range of options that are open to livelihoods under pressure, and in that sense it can play a similar role in support of the incomes of the poor to widening the range of non-farm options for income generation. On the other hand, the environment is itself composed of property regimes, some of which encourage or facilitate conservation or enhancement of the natural resource base, and some of which have opposing effects. It has become increasingly clear that the state plays a pivotal role. This is because in most developing countries, it is the state that is owner of the land that has so far not been utilised for human settlement, or that is very sparsely populated, or that is in designated national parks, conservation areas and so on. It is the state that allocates forestry concessions, determines the conditions under which settlers can purchase or register private ownership of land, promotes or does not promote frontier settlement, and encourages or discourages devolved decision-making capabilities at local levels.

### Diversified livelihoods and environments

It is clear at this point that there is no simple way in which livelihood diversification relates to environmental concerns in developing countries. As with other dimensions of the causes, effects, and attributes of diversification there are multiple processes at work giving rise to many different tendencies and outcomes.

Nevertheless, the preceding discussion has helped to clarify some significant aspects of this relationship. One important result is that sustainability of rural livelihoods is not the same thing as sustainability of particular ecosystems, even though a considerable amount of overlap might be expected between these two scales of sustainability. This is due to a phenomenon that is as much a characteristic of ecosystems as it is of livelihoods, namely, that sustainability of a lower order sub-component of a larger system is neither a necessary nor a sufficient condition for the sustainability of the larger system itself because of the complementarities and substitutions that the larger system is able to make in the process of ensuring its own sustainability. However, one result that seems to emerge quite strongly from sustainability considerations is that diversity is an important property of sustainable systems under conditions of high risk and uncertainty. This is because diversity increases resilience, the capability of the system to recover from adverse trends and shocks.

A second important finding arises from the examination of poverty-environment relations. Here, it was concluded that the responsibility of the poor for environmental degradation has been vastly overdrawn in some quarters. Nevertheless, poverty, livelihoods and the environment interact with each other, especially through the asset portfolio of the poor, and their ability to substitute between assets. The abundant asset held by the poor is their own labour. Where this asset can be combined with other assets, either through ownership or secure rights of access to obtain a viable livelihood, the poor are no more likely to despoil the environment than anyone else. The position in this regard improves the greater the substitution possibilities that exist between assets and activities, thus making livelihoods more resilient, as in the points made about sustainable livelihoods above. However, where no such access is available, or where future outcomes reach such a degree of uncertainty that only immediate survival becomes the imperative, then the poor may act in ways that diminish the future viability for human needs of certain environmental resources.

Property regimes are important in this overall picture. The latter responses tend to occur in situations where no viable common property regime is in place to regulate individual access according to local social priorities. This absence of common property rules, or their neglect, may occur due to active discouragement by the state, misplaced centralisation of local levels of management that could not possibly be organised by the state, social divisions at local levels resulting from widening disparities of wealth and income, abuses of power, and corruption by state or local officials. Private property is not necessarily a solution, and is widely discredited as a policy proposal in the sub-Saharan African context. The advent of devolved district administrations, set up so that the poor can participate in decisions that affect their livelihoods, possibly holds out better prospects for solving environmental difficulties at local levels.

Livelihood diversification into non-farm activities and income sources can have two rather different and, in some respects, opposing outcomes for the en-

vironment. On the one hand, it may take the pressure off those environmental resources that comprise collecting and gathering by rural dwellers. Collecting and gathering, for example, firewood collection, charcoal production, gathering wild fruits and vegetables, hunting wild animals, and so on are typically amongst the lowest return activities in the rural economy. Therefore the advent of alternative activities providing a higher return to labour is predicted to result in switches of labour time out of these activities. Moreover, access to higher cash incomes can result in substitutions in consumption, for example, between kerosene and firewood used for cooking.

On the other hand, diversification involves withdrawing labour from the rural household. It has been observed in some case-studies that this results in neglect of previous conservation practices on farms such as the labour-intensive maintenance of terraces and irrigation canals. However, counter examples to this exist, so that it remains a matter for investigation in differing circumstances, whether, in what circumstances, and in what sequence, earnings from non-farm activities become converted back into farm investment in the medium to long term.

### Summary

This chapter situates environment and sustainability issues within the livelihoods framework, again paying attention to diversification as a livelihood strategy. The livelihood framework incorporates the environment under the rubric of natural capital, as well as via resource access institutions that are part of the mediating processes in the livelihoods approach.

Poverty-environment interactions are discussed, emphasising especially the weakness of superficial arguments about poverty as a cause of environmental degradation, and the need to achieve an understanding of people's substitution capabilities between assets and activities in order to explain the pressure placed on particular environmental resources by human agents in pursuit of their survival. Markets as well as social factors play an important mediating role, especially the way labour markets work in providing or failing to provide alternative means of survival, and the nearby or distant location of wage earning and self-employment opportunities.

The problematic concept of sustainability is examined, not just because the term tends to be utilised more in an environmental context than elsewhere, but also because the livelihoods framework used in this book is often presented as a 'sustainable rural livelihoods' approach. It is unclear, in the end, what additional depth of understanding is provided by the idea of sustainability over and above concepts such as stability, resilience, sensitivity, security, and adaptability also deployed with respect to the viability of rural livelihoods in the long run. Sustainability is especially prone to misunderstanding about the key role of substitution in complex systems, and this is

shown by considering alternative scales of its application—e.g. from the agroecological system, to the livelihoods system, to the economic system at large—where it is manifestly not the case that sustainability of each successively larger and more complex system depends on the prior sustainability of all its component sub-systems.

The chapter considers land tenure institutions as one facet of mediating processes in the access of the rural poor to environmental assets. The case for private ownership often advocated as a means of ensuring natural asset conservation is shown to misinterpret the role of customary tenure in allowing flexible access to critical livelihood resources. Property regimes that protect or facilitate the husbandry of environmental assets tend to arise in the context of power devolved to rural communities; they are inhibited by central state authority and by inflexible administrative procedures that cannot adapt to local circumstances.

Enhanced options for substituting between low and higher return uses of household labour should reduce gathering activities that deplete certain types of environmental resource, for example, trees used for firewood, both through a direct labour allocation effect and through consumption substitution effects. The withdrawal of labour from farm households may have short-term negative effects on conservation activities, but in societies that prize rural land ownership (whether private or customary) not just as a short-term productive asset but as an indicator of social status, and as a social security fallback in the face of urban job insecurity, this effect is unlikely to persist in the longer term. There are also important gender dimensions to these relationships to which we turn in the next chapter.

## Gender and Rural Livelihoods

It is often said that a book like this should not have a separate chapter on gender because gender ought to be fully integrated into all the relationships under discussion. Well, this may be ideally so, but pausing every two or three paragraphs to say 'and the gender implications of this are as follows' does run the risk of resenting gender as merely an accessory to other concerns. Gender is, of course, an integral and inseparable part of rural livelihoods, but given that this book has not been written solely as a gender work, the next best thing, even though open to reproach, is to provide a space where the gender dimensions of livelihood diversity can be examined in a focused and reasonably integrated way. That is the purpose of this chapter.

Gender relations are defined here as the social construction of roles and relationships between women and men (e.g. Baden and Goetz, 1998). These socially constructed roles are usually unequal in terms of power, decision-making, control over events, freedom of action, ownership of resources, and so on. For this reason, gender is fundamentally about power, subordination and inequality, and it is therefore also about ways of changing these to secure greater equality in all its social manifestations for women. The gender approach recognises the vast diversity of relations between men and women across cultures, but nevertheless asserts the lessening of the social inequalities experienced by women as an overriding goal. In contrast, postmodern critics see women's subjective construction of themselves as culturally specific, and they therefore deny any universality in the experience of gender inequalities (for discussion see Jackson, 1997; Baden and Goetz, 1998). This line of thinking is not, however, pursued here.

While gender seems to have been comprehensively taken on board by agencies involved in development policy and practice, the manner in which this has occurred deserves careful scrutiny. In particular, the development profession has found it much easier to assimilate gender through its links to other development objectives than to challenge directly the social and institutional mechanisms by which gender inequalities are perpetuated over time. Thus support to women is often legitimised indirectly by arguing that it will reduce poverty, or increase economic efficiency, or improve environmental management, or lower population growth. In other words, gender as a policy criterion is interpreted as an *instrument* for achieving poverty, efficiency, environment or population goals; and by adopting this approach gender equality is seldom placed up front

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