Poverty and the Environment

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Chapter 1

Introduction: The Poverty of the Environment and the Environment of Poverty

Arild Angelsen[1]

The Poverty – Environment Hypothesis

> *"Many parts of the world are caught in a vicious downwards spiral: Poor people are forced to overuse environmental resources to survive from day to day, and their impoverishment of their environment further impoverishes them, making their survival ever more difficult and uncertain" (WCED, 1987: 27).*

Over the last decade the poverty-environment hypothesis has become a major concern of international development agencies and policy makers. Environmental degradation and poverty reinforce each other: the poor are both *agents* and *victims* of environmental destruction.

The focus on the poverty-environmental linkage has emerged from two different camps. Those concerned with poverty studies have increasingly realized the importance of the state of the environment in determining the magnitude of poverty. More than other groups, the poor depend on the income derived from the use of the natural resource base. In spite of this fact, "if there has been a single thread running through forty years of investigation into the poverty of poor countries, it has been the neglect of this resource base" (Dasgupta and Mäler 1995: 2373).

On the environmentalists' side, the role of poverty in resource degradation has become a major concern. Whereas environmental NGOs previously were preoccupied with pure conservation projects, they have become increasingly engaged in integrated conservation development projects (ICDP). Typically, such programmes attempt both to conserve the natural habitat and provide alternative income opportunities for the local community, thereby reducing the dependency and pressure on environmental resources. The experience of such programmes is mixed. 'Buffer zone development', for example, is an attractive idea. 'In practice, however, buffer zone development activities seem to be designed basically to decrease local opposition to the establishment and expansion of parks and reserves, rather than to offer sustainable livelihood alternatives' (Ghimire 1994: 225, based on case studies from Thailand and Madagascar).

The poverty-environment hypothesis is part of the ruling "development paradigm". "The fundamental premise of mainstream SD [sustainable development] thinking is the two-way link between poverty and environmental degradation" (Lele 1991: 613). The Brundtland commission (WCED 1987), the World Bank's main report on environment and development (World Bank 1992), and the United Nations Environment Programme Report (1995) on poverty and the environment all focus on the connection between poverty and environmental degradation.

While the debate of the 1970s was heavily influenced by the 'Limits to Growth' thesis, the slogan of the 1990s is 'win-win' (World Bank 1992). The poverty-environment hypothesis suggests that economic growth is needed to break the poverty-environment downward spiral: policies that promote economic growth also often benefit the environment. Economic growth eventually reduces poverty, and therefore enhances environmental conservation.

Poverty reduction and environmental conservation represent two of the main global challenges. The question is not whether they should be linked, but how to link them. It is rather indisputable that the poor often become the victims of environmental destruction. They depend heavily on the resources provided by natural environments and they are less able to escape the effects of environmental pollution. "Environmental damage almost always hits those living in poverty the hardest" (UNDP 1998: 66).

The opposite linkage is far less obvious. Some argue that short-term survival needs give little scope for taking long-term environmental effects into account. 'Environmental thinking starts after breakfast', and with insufficient meals or no meals at all, there will be little environmental thinking. The papers of this book suggest, however, that one needs to go beyond such simplistic explanations. They question whether low income does indeed cause environmental destruction, and especially - as a corollary to this – whether higher income (economic growth) will reduce the problem. Further, they question the relative importance of the behaviour of the poor in environmental degradation and instead focus on degradation resulting from exploitation by powerful (and rich) groups and misguided government policies.

The coexistence of poverty and environmental disruption can be understood as the outcome of two processes having the same root causes. A key term in this connection is environmental entitlements, or *resource rights.* Insecure property rights to natural resources, or a complete lack thereof, create both a situation of poverty and give small incentives for sound resource management. The resource rights structure, the institutions governing resource use and access, reflects the limited power and influence of poor groups. The country and local case studies in this book report local communities losing resource control to powerful groups outside the community.

Yet another argument against the orthodox thesis is found in the 'indigenous people' and agroecology literature, a different research paradigm. Traditional agriculture, practised by people living close to a subsistence level of material consumption, is highly diversified and therefore more in line with natural eco-systems, as exemplified in the chapter by Ekoko from Cameroon. People live in intimate contact with nature, and this creates cosmologies that stress ecological balance. An alternative explanation is that farmers diversify due to risk aversion

and production only for own consumption (lack of market integration). Higher cash income will often be associated with a breakdown of the diversity of traditional practices, and may therefore result in environmental degradation.

This introductory chapter attempts to give a brief overview of some of the basic issues in the poverty-environmental degradation debate. I present a simple conceptual framework for the discussion (section two), and identify three different vicious circles. Section three discusses how such circles can be created, maintained or broken. Section four summarizes the contributions in this book.

The Causal Linkage: A Theoretical Framework

There is a rapidly growing literature on the linkage between poverty and the environment, yet there is relatively little theoretical work linking the variables together in a consistent manner. Leach and Mearns (1992) and Reardon and Vosti (1995) provide two examples of quite wide conceptual frameworks. These authors focus particularly on how local level resource use is influenced by conditioning factors (Reardon and Vosti) or structuring processes (Leach and Mearns). In contrast to such wide frameworks, formal economic models typically focus on the unilateral links from poverty-induced high discount rates or short time horizons to overuse of environmental resources, possibly also with a feedback from a deteriorating resource base to lower income in the future.

The suggested framework in this chapter, inspired from systems analysis, provides a middle ground: it includes factors normally excluded in economic models, while at the same time suggesting more explicit linkages between the various variables than the general frameworks do. Obviously, there is a trade-off between being explicit and general. I believe there is a need to bridge the simple unilateral relationships of economic models and the quite wide frameworks suggested by the above mentioned authors.

This book focuses mainly on rural poverty and the degradation of natural resources such as forests and soil. A poor, resource dependent, agriculture-based rural society is also the reference point when making the framework, which is sketched in *Figure 1.1*. Starting with the *resource base*, the development of the resource stock is determined by four factors: the resource use (extraction) and the resource investments, either by local or external users. The level of *poverty*, which here is the inverse of income, is a function of the local use of natural resources and external (off-farm) income, as well as population and the technology and market prices. *Local resource use* is also affected by the

population size. Poverty affects resource use according to the standard poverty-environment hypothesis discussed above. The effect of technology and market prices on local resource use is ambiguous, as discussed below. *Local resource investments* are determined in a similar manner as the local resource use.

A key variable in this framework is local *environmental entitlements,* which is also central in the framework of Leach and Mearns (1992). This represents an application of Sen's (1981) entitlement approach to the environment-poverty complex. Of particular importance are institutional arrangements in the form of the property rights regime governing the resource use: who has access to natural resources, what are the rules for their use, how effectively are the rules enforced, etc. The local resource rights are functions of, *inter alia*, the use and claims made by external users, and the level of poverty. Environmental entitlements in turn affect both the local resource use and investments (with opposite effects on the resource base).

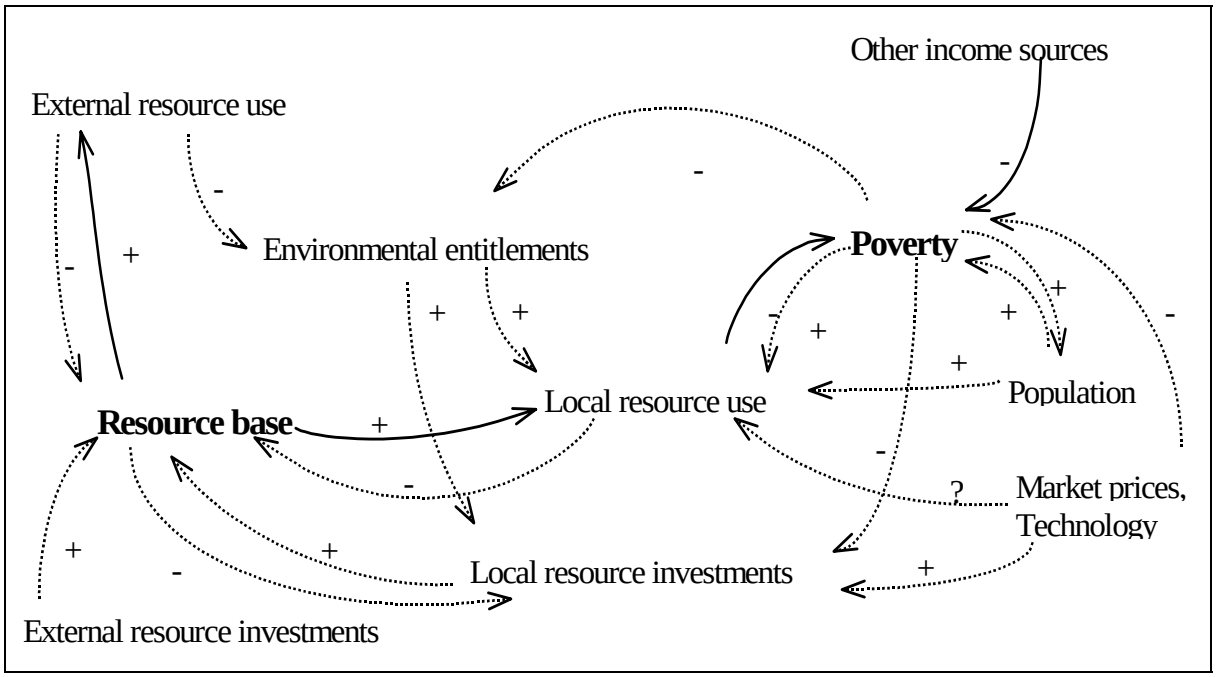

Figure 1.1: Some causal linkages between the natural resource base and poverty. Dotted arrows indicate that a variable affects another; solid arrows represent physical or income flows

Underlying the framework in *Figure 1.1* is a set of political, socio-cultural, and economic factors that are not made explicit in the figure. The figure contains a number of causal loops or potential vicious circles, which we shall examine below.

Vicious Circle I: Resource Degradation through Lack of Investments and Overuse

The conventional argument of the poverty-environment connection is the first vicious circle between poverty and the resource base, working though the effect on local resource use and local resource investments. Low income forces the users to increase the resource use in order to survive, which again diminishes the natural resource base. A lower resource base then reduces the flow of services generated, which further intensifies poverty. Poverty would be reflected in a high valuation of the present versus the future, i.e., high discount rates. The chapter by Holden *et al.* presents empirical evidence on this linkage from Ethiopia, Indonesia, and Zambia.

The authors show, for example, that poverty leave peasants with little surplus for investments that could enhance the long term productivity of the resource base. Similarly, Reardon and Vosti (1995: 1496) argue that "the criterion for poverty in environment-poverty analysis should be the ability to make minimum investments in resource improvements to maintain or enhance the quantity and quality of the resource base, to forestall or reverse resource degradation". This 'investment poverty' is a stronger criterion than the conventional focus on 'welfare poverty', as households above a welfare-determined poverty line could still be investment poor.

Whereas the operation of this vicious circle has some intuitive appeal, it can be challenged on several grounds. It is by no means certain that higher income will be used for resource conserving/enhancing investments. First, insecure property rights (environmental entitlements) will make such investments more risky. Second, the collective good nature of many environmental resources (and thereby also resource investments) will reduce the individual incentives for investments, and create problems of free or easy riding. Third, higher income can also be used for capital investments that increase the pressure on natural resources. There are several examples of this phenomenon:

- *Overgrazing:* In pastoral communities livestock is commonly the main object for asset accumulation, and the potential for overgrazing is proportional to herd size. In some contexts, the poor cause less pressure on grassland, as they cannot afford to own many animals. Higher income will in this setting increase the environmental stress. Failure to recognize this link may lead to unintended effects of development programmes, as has been the case of aid projects in the Turkana district of Northwest Kenya. Income generating activities (fishing) were supposed to provide an alternative source of income for the nomads in the area, and thereby reduce the herd size. Instead, the surplus from fishing was invested in more animals that increased the environmental pressure (Johan Helland, pers.com.).

- *Deforestation:* Just as higher levels of income can result in overgrazing, higher income can also be used for investments in, for example, chainsaws which makes forest clearance easier for local farmers. More generally, investments which increase the profitability of frontier farming will contribute to more deforestation under a quite wide range of assumptions (see Angelsen 1999).

- *Overfishing:* Investments in more efficient fishing gear could increase both the fishing efforts and the efficiency, putting the fish stock under increased pressure and increasing the likelihood of unsustainable levels of catch.

Poverty reduction may be most environmentally beneficial in agriculture in situations where the lack of any surplus (capital) results in inappropriate technologies (Reardon and Vosti 1995). In particular, capital-led (as opposed to labour-led) intensification may be a sustainable path in resource-poor areas as fertility-enhancing inputs can make the farmers avoid nutrient depletion and soil erosion. Purchased inputs then become direct substitutes for natural resources.

As a general working hypothesis for empirical investigations into the environmental effects of poverty reduction or increased income in resource dependent economies, I suggest the following:

> *If the environmental effect is mainly determined by the scale of the activity, with limited scope for substitution between man-made and natural capital, then higher income will increase the pressure on the natural resource. If, on the other hand, man-made capital can replace natural capital relatively easily, and the main constraint is the farmers' ability to purchase man-made inputs (investments), then higher income will reduce the resource pressure.*

Vicious Circle II: Entitlement Degradation

A vicious circle of entitlement degradation may be at work in *Figure 1.1*. Poverty influences the environment entitlements negatively, which in turn affects the access and possibility for making use of the resource base, thus diminishing the potential for poverty reduction. This vicious circle *may* therefore strengthen the first vicious circle discussed, even though this may not necessarily be the case: the loss of environmental entitlements could well completely exclude the poor from using the resource, in which case the development of the resource base is determined by other users.

There are several mechanisms through which poverty may reduce local environmental entitlements. Property rights to land in the form of land titles are costly, and poor farmers rarely can afford to obtain titles. Tenure security also

depends on the investments in land made and the farmer's ability to enforce his or her rights, two factors that are positively correlated with the income level.

At a more general level, poverty is closely linked to *vulnerability*, which describes as individuals' position in the society rather than the relation to the physical environment. Within our framework, vulnerability is associated with a lack of environmental entitlements.

The lack of access and control of natural resources by the poor often refers to their disadvantaged position in political processes. Conflicts between the nation-state and poor, resource-dependent groups is well-documented (e.g., Colchester 1994, on forest resources in Asia). Their weak position is also reflected in local processes. Romantic views about egalitarian traditional, pre-capitalist societies still exist. There is, however, an increasing amount of documentation concerning how local elites gain control over resources and use them to their own advantage and at the expense of poor groups, often with the backing of (their interpretation of) customary law (e.g., Berry 1989).

Vicious Circle III: Poverty and Population Growth

The third vicious circle within our framework is the link between poverty and population growth. Poor families tend to have more children than richer families, and ‘development is the best contraceptive’. However, the poverty-population-environment nexus is far more complex than such simple hypotheses suggest. Whereas the link between family size and poverty is a widely accepted issue, the impact of population growth on the environment is not. Many argue that data do *not* support the thesis that environmental degradation is largely due to population growth (e.g., Shaw 1992).

A possible way of reconciling the different views and diverging empirical evidence is to distinguish between *conditioning* and *pressuring* factors in environmental degradation. Conditioning factors are the well-known explanations from environmental economics and other social sciences: market failure (externalities, public goods, etc., see chapter by Matti Vainio) and policy failure. The conditioning factors determine the incentives for environmental conservation. Pressuring factors include population and the level of production and consumption (GDP/capita). Population growth will thus lead to more environmental pressure in the presence of significant market or policy failures. However, if the institutional setting, market conditions, and policies are such that there are strong incentives for environmental conservation, then population growth will not necessarily result in environmental degradation.

Breaking the Vicious Circles

Any vicious circle is also a potential virtuous circle. According to our framework there are a number of entry points for intervention which can break the vicious circles and create a process of income growth while maintaining or enhancing the resource base. We shall examine these in turn. Obviously, the variables discussed also provide explanations of why vicious circles were created in the first place, and we also pay some attention to these stories.

'Employment for Environment'

The most obvious and possibly also the most effective way of breaking the circle is to provide alternative sources of income which reduce the dependence on the resource base and therefore reduce resource extraction. The principle of "substituting employment for (degradation of the) environment" (Leach and Mearns 1992: 65) is central on development agencies' agenda for poverty alleviation. The World Bank (1990) emphasizes that the most effective policies to combat poverty are those which increase the demand for the most valuable asset of the poor - labour. The chapter by Yee and Johari provides an example of a country (Malaysia) where labour-intensive economic growth has contributed to a significant reduction in the proportion of the population below the poverty line. Other Asian countries have had similar experiences. We also need to consider here the possibility for higher income contributing to more resource degradation (as discussed above with examples from overgrazing, deforestation and overfishing), and the increase in pollution that normally accompanies economic growth (e.g., Angelsen 1997). This possibility is largely ignored in the literature, e.g., Leach and Mearns (1992).

Whereas off-farm job creation is indeed a good idea, there are numerous obstacles in designing and implementing effective programmes and policies towards this end. The experiences of rural employment programmes have been mixed. The recent history of East and Southeast Asian countries indicates that growth in labour intensive sectors is the best long-term strategy for providing 'employment for environment'. At the same time, high economic growth may be accompanied by processes of marginalization and exclusion that make new groups fall below the poverty line and possibly also increase the number of ultra-poor.

Empowerment (Environmental Entitlements)

Empowering of local communities and poor groups is one of the most recent slogans in the development debate, possibly as a reaction to an underestimation of its importance in the past. Within our framework empowerment of poor groups (more access to and control over the resources) will contribute to higher income and thereby reduce or break the vicious circles. Equally important, it will improve the incentives for resource investments and long term management of the resource. Issues related to property rights, respect for traditional user rights, tensions between customary and statutory law, etc. are central in the debate on local environmental entitlements. A positive example on how transferring rights (a share of the income) to the local population may contribute to both poverty reduction and forest conservation is provided by Chitsike in the chapter on the CAMPFIRE programme in Zimbabwe.

The loss of entitlements is also a key factor for explaining how vicious poverty-environment circles were created in the first place. A review of some 30 case studies by Kates and Haarmann (1992) tells the following story, as summarized by Lopez (1992: 1138-39):

> *"The key source of rural environmental degradation is the disruption of the traditional institutions of the poor, which until recently had permitted an efficient and sustainable use of resources. The collapse of traditional systems leads to a vicious circle of environmental degradation and further impoverishment. ... What causes the institutional collapse? Here the case studies differ and tell different stories. Studies in Asia, and particularly Latin America, report displacement and loss of entitlement of resources originated in factors external to the communities, while those in sub-Saharan Africa emphasize internal factors. Large scale agriculture, export oriented forestry operations, and major public infrastructure projects are repeatedly mentioned among the external factors. ... The population expansion issue is central in case studies that emphasize internal factors."*

This review of the case studies reflects a view of traditional resource management institutions as being able to secure a sustainable (and equitable) management of the resources, a position that is controversial. "Part of the mythology of late twentieth century environmentalism is that certain 'traditional' peoples are uniquely adapted in ways which ensure that their material and spiritual resources are held in balance ... [and] have cosmologies which stress environmental harmony" (Ellen 1993: 126). Baland and Platteau (1996: chap. 10) also question the conservationist ethos of traditional societies. First, the thesis is mostly concerned with societies operating in a homeostatic environment, for example, low population growth, no technical change, and no radically new trade opportunities. Second, traditional conservation practices may

be unintentional. The technology may be so primitive (inefficient) and/or the population density so low that people simply cannot exhaust the resource base.

The above is not intended to question the many examples of successful collective management of common resource at the communal level (e.g., Ostrom 1990). It should, however, serve as a warning against *general* propositions about traditional societies being inherently sustainable and equitable in their use of natural resources. The role of external *v.* internal factors must be subject to case-by-case investigations. Normally these factors will also interact, as exemplified in a study of deforestation in Sumatra, Indonesia (Angelsen 1995): external factors have been important in initiating a 'land grabbing race', but the race is now largely maintained and magnified by internal factors, such as population growth and aspirations for larger land holdings and higher income.

External Resource Use and Investments

A third point for intervention is external resource use and external resource investments, which affect the amount of resources that can be extracted by local users without degrading the resource base. External resource use is also closely related to loss of local entitlements as discussed above, but it may be useful to distinguish between the effect on physical resource degradation and entitlement degradation.

Physical investments in the resources can in some cases be a policy option to break the vicious poverty-environmental degradation loops. Reforestation projects are an example of such investments, which will have both local and global benefits.

Technology and Prices

The role of technology and prices in establishing, maintaining, or breaking vicious circles is a complex issue. Generally, it seems fair to assume that higher output prices and improved technology will both reduce poverty and increase the incentives for resource investments as the future value of the resource is augmented. This will contribute positively to breaking the vicious circles.

The effect on the present level of resource exploitation is, however, ambiguous. There are a number of different effects to take into account. Consider decisions about how much to work and produce in a relatively isolated community where livelihood is based on resource dependent activities. Improved technology or higher output prices will have two opposite effects on the scale of the activity

and thereby the resource use. First, better technology or prices imply that the community can maintain the same income by reducing resource extraction - they get more income per resource unit exploited. This is known as the income effect in economics. On the other hand, the resource dependent activities will become more profitable, and this will stimulate the people to work more and hence increase their resource use (the substitution effect). The net effect is ambiguous. Angelsen (1999), applying this model to deforestation, argues that in poor economies the income effect will dominate, thus implying that an output price increase will be positive for the environment.

Yet if one considers the effects of migration, this conclusion is likely to be reversed. When economic activities based on resource extraction become more profitable, this will attract new migrants and increase the pressure on resources. We may then have an unpleasant conflict between, for example, poverty reduction in frontier agriculture and conservation of rainforests.

Population Control

Any discussion of poverty-environmental linkages is incomplete without discussing the role of population growth. As already alluded to, the role of population in environmental degradation is a controversial issue. Poverty is related to lack of assets, and "the range of types of poverty is the range of lack of the various assets" (Reardon and Vosti 1995: 1495): natural, human, physical, and financial capital. Whereas poverty is often thought of as a lack of physical and financial capital (and possibly also natural capital), there may be situations where labour shortage is the problem. "It appears that underpopulation as a source of environmental degradation is a phenomenon common in the highlands of Latin America where rural-urban migration is intensive... [It] has generated labour scarcity which is not compatible with adequate highland resource management" (Lopez 1992: 1140).

For Sub-Saharan Africa, however, there appears to be some consensus that population growth is a major contributing factor to the ongoing processes of environmental deterioration (Cleaver and Schreiber 1994). The region lags behind other regions in its demographic transition, with fertility rates in excess of 6.5 children per woman remaining virtually unchanged for the past 25 years. Population control programmes are still a controversial issue (Shaw 1992), but there is hardly any doubt that stabilization of the population is a key to the region's long term development.

The Contributions of this Book

The book is a collection of mainly empirical studies exploring the linkages and interrelations between poverty and environmental degradation. All of the papers (except this introductory chapter and the one by Holden *et al.*) emerge from a workshop held in Sabah, Malaysia in October 1995. They present the results of recent studies, and give fresh insights into the ongoing debate on poverty-environment linkages while questioning popular and simplistic views on the links.

The editors are fully aware that the book does not give a complete overview of the topic, although many important issues and cases are covered. There are, for example, no studies from Latin America, and some issues, such as the population-poverty-environment nexus and the effect of global economic liberalization, are not covered as thoroughly as they may deserve to be. The slightly less ambitious objective of this book is to bring out to a larger audience some important case studies, and try to draw some general conclusions based on these and other studies (as is done particularly in the final chapter).

The first two papers deal with two key issues within economics and social science more generally, namely property rights and myopia (short time horizons). These are complementary approaches to the study of the link between poverty and environmental degradation. *Matti Vainio* argues in Chapter 2 that insecure, unclear or non-existent property rights explain to a large extent why poor people suffer from or cause environmental degradation. By better defining the property rights, the poverty can be alleviated and the environment improved. Governments have a special responsibility to provide corrective action in the presence of negative externalities because only nation-states have the power and authority to establish and enforce legal frameworks to regulate the use of environmental resources. Moreover, they transfer resources between different social groups. Unidirectional negative externalities are particularly anti-poor. Subsidies to energy, agricultural inputs, etc. may be harmful not only because of their negative economic impact but also due to their effects upon the environment and poverty. Many country and local case studies report on local communities losing resources to powerful, outside-the-community groups. Governments need to reverse many of these policies and support the local management of common property resources.

In spite of the fact that the poverty-environment hypothesis has largely been the preoccupation of economists, there are few empirical, quantitative studies on this relationship. One of the very few comparative studies on the relationship between poverty and high discount rates (myopia) is presented in Chapter 3 by *Holden, Shiferaw, and Wik.* Field studies among rural people from Ethiopia, Indonesia and Zambia found that discount rates were in general very high.

Poorer households and/or households with severe immediate cash or food needs have higher discount rates than others. In Indonesia and Zambia immediate cash needs and problems of consumption- smoothing seemed to be more important than total income in explaining the rates. In the Ethiopian study, where the households were generally better off, total income played a more important role. Their findings indicate that poverty and related credit market constraints have important consequences for behaviour (for example, investments in environmental conservation). Secure property rights, although necessary, may therefore *not* be a *sufficient* means to achieve sustainable management of the resources.

The next two chapters are countrywide studies, exploring the poverty-environmental linkages at the macro level, and also discussing the effects of policies. In a study from India, *B.K. Nagla* discusses the issue of gender-differentiated environmental impacts, namely the feminization of poverty and women as environmental managers. He discusses how natural-based conflicts revolving around competing claims over forest, land, water and fisheries have generated new movements struggling for the rights of victims of ecological degradation. A central question is how ecological changes interact with gender roles and strategies for improving women's livelihood. Empowerment of women is a key to both poverty reduction and environmental conservation.

The study from Malaysia by *Yee* and *Johari* notes that macro (national) data on very large reductions in the number of people below the poverty line may differ widely from observations made at the micro (local) level. Policies and programmes designed to address poverty and environment concerns need to be informed by such a multilayered analysis if they are to be effective and sustainable. The paper looks at interactions and linkages between poverty and the environment among four groups in Malaysia: artisanal fisherfolk, shifting cultivators, the *Orang Asli* or indigenous people of Peninsular Malaysia, and urban squatters. For example, the artisanal fishers are clearly victims of environmental degradation caused to a large extent by outside trawlers, rather than local agents of destruction. The main problem of the *Orang Asli* is lack of legal ownership of their land.

A third set of papers are local level studies, each of which provides instructive examples of how the poverty-environment linkages operate at the village levels. They give examples of how a process of environmental degradation may be initiated and maintained. In the case of the Congo, access to new markets played a critical role, whereas in the Philippine case appropriation of the resource by outsiders (the state) reduced the resource base to such an extent that meeting the subsistence needs made an overexploitation of the remaining resources hard to avoid. The third study of the book, however, provides a positive example from

Zimbabwe of how environmental conservation and poverty reduction can be merged.

In Chapter 6, *L.B. Valencia* deals in some detail with a hydropower development project, which would have a significant impact on the sites traditionally inhabited by an indigenous group (the Bugkalots) in the Philippines. Bugkalots believe that they own the valley that they occupy. The government regards the swidden cultivation of the Bugkalots as destructive whereas the Bugkalots think that the government should regulate and control the logging activities of the logging concessionaires. The project provides an example of the continuing clash between perceptions as to the meaning of 'people-centred environmentalism' versus development. This group has over the years been driven to their present habitat by equally poor lowlanders, and considers this site their last stand. The paper suggests that indigenous groups, being poor, are always the subject of the most disconcerting aspects of 'development'.

The Chapter from the Congo Basin Rainforest by *Francois E. Ekoko* is based on the author's field studies among three forest-based groups. Using any conventional poverty measure the people of Bakas would be classified as the poorest of the poor, but they have not been involved in deforestation. This case study illustrates how a community at a certain level of its historical evolution behaves vis-à-vis the environment. The evident lesson is that poverty does not necessarily lead to deforestation. The study suggests, however, some factors which could lead poor people to become engaged in excessive deforestation: (i) higher market demand for forest products; (ii) cultural changes in the from of a change form a subsistence to a consuming society; and (iii) infrastructure (roads), which both opens up new markets and make access to new forest areas easier.

Chapter 8 by *L.T. Chitsike* should provides a more optimistic end to the book. The Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe is documented by a researcher who has been actively involved in one of the success stories of local environmental management. The recipe for the success has been simple, but effective: the local communities receive a significant share of the wildlife-generated benefits (mainly hunting licenses), which provides a direct interest for habitat preservation. The general lesson from this (and other) programmes is clear: one is advised to provide users with incentives for environmental conservation. The particular success of the CAMPFIRE programme lies partly in the fact that the central government has been willing to distribute some of the benefits to local communities, that mechanisms and institutions for channelling the benefits to the people exist, and that there are indeed great benefits for habitat preservation, in particular large animals suitable for tourism and controlled hunting.

The final chapter by *Angelsen and Vainio* summarizes and draws some general conclusions. We put forward five general lessons: (i) traditional uses are often sustainable; (ii) poverty and environmental degradation affect women and men differently; (iii) external resource appropriation and the loss of local entitlements trigger off poverty and weaken or destroy local management systems; (iv) the downward spiral can be reversed by making environmental conservation compatible with uses profitable to the users; and (v) poverty and environmental degradation are normally outcomes of the same processes.

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Notes

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Chapter 2

Unclear Property Rights, Environmental Degradation and Poverty

Matti Vainio[1]

Introduction

Much environmental degradation in developing countries is gradual and almost invisible. The visible nuclear or oil leakages and floods as well as the environmental impacts of large highway and dam projects draw media attention. However, these large single environmental events are still responsible for a relatively small portion of the degradation of the environment, and in particular the environment of the poor. The main source of environmental degradation in developing countries is due to small, almost unnoticeable damage by many people to one another (Dasgupta and Mähler 1994). Thus, often the «invisible poor» (see, for instance, Chambers 1983) are living in almost invisibly but gradually degrading environments.[2]

Poor people tend to live in environmentally degraded areas. Leonard (1989) has estimated that 60% of the poorest in the world live in ecologically vulnerable areas comprising rural areas of low agricultural potential and urban squatter settlements. [3]

The purpose of this study is to show how the structure of property rights in natural resources affects the poor and the environment as well what it is that links them. Specifically, the purpose is to show how poorly defined and enforced or non-existing property rights cause environmental degradation and increased poverty. It is proposed that the link between poverty and the environment is usually indirect, and that this link is created by the structure of property rights.

The thrust of this paper is that the structure and lack of clarity of property rights explain why poor people suffer from or cause environmental degradation. Additionally, it is proposed that by better defining the property rights, the plight of the poor as well as the environment can be improved. The main problem is to determine the kinds of property regimes under which the poor are likely to become either «environmental guardians» or «environmental destroyers».

Property rights have not been defined clearly in many countries. Moreover, most of the common resources are used without taking into account poor or vulnerable population groups. To the detriment of the poor, many developing countries *de facto* recognise polluter's rights, either because of legislative flaws or enforcement problems. This implies that the private costs of production are lower than its social costs and thus excessive use of the resource would be expected. This leads to undesirable phenomena, such as deforestation, water pollution, overfishing or soil erosion.

Property rights are an important poverty issue. Empirical studies have shown that common property resources are disproportionately important in the livelihoods of the poor. For instance, in seven dry Indian states, 84% to 100% of

poor households depend on fuel, fodder and food items from common property resources. However, only 10% to 19% of the rich households are in the same situation (Jodha 1990). Moreover, common property regimes often play a complementary role in private farming activities by mitigating seasonal bottlenecks.

Property rights alone are not always sufficient to explain the occurrences of increased poverty or degradation of the environment. Information deficiencies, such as inadequate and asymmetric information, as well as uncertainties of long term effects of environmental change may explain why environmental degradation sometimes occurs simultaneously with an increase in poverty. It has also been suggested that the binding constraint on current consumption of the poor may give them no option but to continue to exploit nature in a unsustainable way. These issues are, however, beyond the scope of this paper.

While the discussion and examples in this study are at local national level, it needs to be emphasised that the current overuse of global open access resources, such as air (e.g., in the form of CFC and CO_2 emissions) and sea (e.g., overfishing) has been or can be reduced to a sustainable level only through international co-operation. The property rights for these resources can be defined in such a way that poverty is reduced. This challenging opportunity for reducing global poverty and environmental degradation is not, however, the focus of this study because it concentrates on environmental problems and poverty at local and regional levels. Environmental problems in urban areas have not been analysed explicitly although much of the discussion in the paper is applicable to squatter problems as well as to pollution.

This chapter is structured in the five sections. Section 2 makes a typology of the main property regimes. Section 3 establishes the link between unclear property rights, externalities and poverty. Section 4 analyses the impact of different kinds of externalities on the use of environmental resources and highlights their relevance and links to poverty. Conclusions and policy implications are given in section 5.

Types of Property Regimes

Ambiguous property rights give rise to many social and environmental conflicts. In many developing countries property rights of land and forest areas are ambiguous partly because communal ownership is widespread but also because of conflicting claims: land being neither completely private nor public has made the situation more problematic. In addition to land, there are problems related to

defining the ownership of air, surface and underground water resources. In this chapter, the terminology is clarified by classifying the property regimes and by showing the differences between them. Four types of property regimes are used: private, joint (private or communal), public and open access.

Private Property Regime

In a private property regime, individuals or households have property rights over the environmental entitlement. Typical examples of this most common type of ownership are property rights over growing crops on the land of the household or the ownership of domestic animals.

Ownership of a particular asset does not, however, imply unlimited or uncontrolled property rights even on his or her own land. A farmer cannot necessarily use environmentally unfriendly production methods (for instance, by applying particular chemicals) nor is he allowed to grow certain crops (for instance, by planting coca). Limitations to property rights do not come simply because of government regulation but common law or any other judicial system also place limits on what the private property owners may or may not do.

Joint Property Regime

In a joint property regime, it is crucial to make a distinction between two groups of property regime: (a) legal subjects in national legislation and (b) semiformal or informal groups of people who own the property jointly without being legal subjects in the national legislation. An example of the former is a logging company and of the latter the traditional village.

In a joint *private* property regime, the owners of the company have the effective rights of their property in the same way as in the private property regime, as stipulated in the regulations of the company. In large companies, the owners have given the right to manage the property of the company to the executives. Still, as the company regulations and national legislation define the legal status of each party, there should be no ambiguity concerning the effective control of the environmental and other assets of the company. The property regime of joint private owners is similar or equal to private owners: national legislation recognises the property right. Co-operatives also belong to this group.

Communal ownership gives rise to difficulties because national legislation often either ignores the property right or does not recognise it effectively in its jurisdiction. Traditional or customary herding, hunting, fishing or cultivation rights often fall under this category. Often communally managed resources fall

legally under public ownership of some kind. These communal resources are called common property resources.

Leach and Mearns (1992) argued that institutions administering common property are more likely to remain functional in areas that are remote or marginal within a country. They summarised the following conditions for common property regimes to be successful:

(i) Limited size and clear definition of common pool resource;

(ii) Necessity of common pool resource to livelihoods of co-owners;

(iii) Group membership clearly defined;

(iv) Group is reasonably small and has homogenous interests;

(v) Effective sanctions apply;

(vi) Community is relatively autonomous from the state.

Implementation of effective management over natural resources or controlling pollution is an essential component on exercising the property rights. The further away the owner is either in physical or mental terms from the resource the fewer possibilities or motivation it has to exercise its property right. This is one reason why public ownership of property has a disadvantage. Only relatively lately has there emerged literature concerning the relative merits of joint ownership as a cost-effective alternative for managing environmental resources. The failure to explain how indigenous people manage to use certain natural resources sustainably refutes the assumption that privatisation or state control are the only possibilities for governing common property resources (Ostrom 1990).

Public Property Regime

Under a public property regime, governments, municipalities, rural councils and other public authorities own land, water, rivers, air space and use them for different purposes. Examples of these are national forests and municipal parks. Also the government executes its right over the use of its seas for ships or its air space for the use of aircraft.

Because of legislative power, public authorities have the right to regulate or change the property rights of environmental entitlements within its geographical boundaries. For instance, the government may enact legislation by which the fishing rights of inland lakes could be changed. By allowing or forbidding

particular kinds of fishing methods the government will change the property regime of the fisheries. By allowing a particular industry to pollute a river (or require it to clean up its sewage) the government or local authority changes implicitly or explicitly the property regime of the clean water.

Open Access

The property rights over air, seas, lakes, rivers and ground water resources have not been effectively defined. These are examples of *open access* resources that fall theoretically mainly under public ownership: although international seas, seabeds and airspace above them do not fall under any national legislation. These are *de jure* open access resources.

De facto open access resources are those that government or regional or local authority do not effectively control. Inadequate legislation to define the rights of use of the resource is sometimes the root of the problem. Even if such legislation exists, *de facto* open access situations may prevail because of enforcement problems due to, for instance, the difficulties in monitoring the use of the resource.

Confused Terminology between «Common Property» and «Open Access»

Hardin's (1968) introduction of the «tragedy of the commons» argument was based on confused terminology. He referred to «open access» rather than to «common property» regimes. However, this confusion has led to the erroneous conclusion that tenure security and incentives to manage open access resources sustainably are possible only under private or public property regimes. This fails to admit that it is possible to manage environmental resources in a sustainable manner under a common property regime if the conditions for its management are appropriate.

In practice the distinction between common property, public, and open access property regimes is ambiguous. In this study, common property resources refer to resources that fall legally under public property regime but which are effectively controlled by an informal group.

Confusion due to Different Kinds of Regimes for Same Area

The existence of different kinds of property regimes in the same area confuses the analysis and gives rise to incorrect interpretations. Property regimes can be very complex. For instance, in Indonesia under the customary (*adat*) land rights, land is regarded as the property of the community in the way that this communal right to land cannot be bought, leased or sold (Angelsen 1997). Many forest products could be collected freely by the members of the community. In addition, individuals can clear the forest and use it for shifting cultivation and they have the right to income from the agricultural production. Also for some valuable forest products (e.g., honey or wild rubber trees), when demarcation is possible, individual use and income rights apply. In short, the property regime depends on which rights one refers to (use, income or transfer rights), or which uses of a particular resource or area.

Individual action can also alter the property regime, so that common property (forest) becomes effectively private property (agricultural land). In many countries, the conversion of forest land into permanent agricultural use gives the right for the individual to ownership over that land. In many other tropical countries, both according to customary and national law, a way to obtain and secure land rights is to clear the land and start growing perennial crops or trees (Angelsen 1995). Generally there is a trend towards more individualised and secure property rights as the resource becomes more scarce.[4]

Externalities, Property Rights and Poverty

Negative externalities[5] exist if the consumption or production of private goods lowers the welfare of other people or the output from firms. Externalities are problematic because the prices of products do not reflect the true costs of production or consumption.

Pigou suggested in 1920 that the government should remove negative externalities by setting a tax equivalent to the marginal damage of the pollution. In this way the costs of externalities would be internalised into the price of the good. The tax would be paid to the government without compensating the victims.

A useful way to look into externalities is to analyse how well the rights of use of the resource, such as air, surface or ground water, forest or land has been defined. If these rights have not been clearly defined, the use of the resource by someone will cause externalities to others.

One of Coase's (1960) major contributions to economic theory has been to point out the equivalence between unclear property rights and existence of externalities. Coase suggested a radically different approach from Pigou by claiming that *if there are no transaction costs, there is no need for government intervention to correct for the environmental problems. The most efficient solution is to define clearly the property rights*.[6]

Transaction costs would alter the Coase theorem in two ways. First, if transaction costs were high the producer of the damage and the victim could be put into the same legal entity. For instance, if a factory polluted the neighbouring land, and if the litigation procedure was non-existent or very costly, the factory and the land could be placed under the same juridical body (i.e. a firm) and – provided that the administrative costs of organising the actions within the firm were not high – the optimal pollution level could be achieved. In practice, this means that the victimised landowners would purchase the polluting factory or *vice versa*. Second, if the administrative costs of organising actions within the firm are high, for instance if the number of actors suffering from or causing pollution is high, the government, being *«in a sense, a superfirm ... because it can avoid the market altogether which the firm can never do»* (Coase 1960: 14), is able to correct the problems cheaper than a private organisation. Although Coase's theorem has been used for advocating the market to deal with environmental problems, he emphasised that the problem to solve the environmental conflicts is one of choosing the suitable social arrangement for dealing with the harmful effects.

Unclear property rights give rise to unidirectional and reciprocal externalities. Unidirectional negative externalities are the ones that are normally treated in textbooks concerning pollution, i.e., where the production or consumption of a good decreases the well-being of other people. Examples of unidirectional negative externalities are (i) water or air pollution caused by an industrial complex, and (ii) increased erosion, siltation and floods due to forest logging in the uplands. The society can increase the welfare of its citizens – and in particular of the poorest and most vulnerable ones – by seeing to it that the costs of unidirectional externalities are internalised. This is in balance with Rio Principle 16: *"National authorities should endeavour to promote the internalisation of environmental costs and the use of economic instruments..."* (UN 1992).

Reciprocal externalities are prevalent in open access resources, such as fisheries or forests where nobody effectively controls their use. Unlike in the case of pure public goods, the consumption of open access resources is rival; i.e. the consumption of the resource by one person can be at the expense of another person. In this case, the private costs of using the resource fall below its shadow price and there is an incentive to overuse the resource. A shadow price of a good

takes into consideration the externalities of production or consumption. The larger the externality the greater the difference is between the shadow price and the market price. In the case of reciprocal externalities, all people would benefit from an optimal use of open access resources. However, the poor would benefit in particular, because they have less private property than the rich and thus, their consumption is more dependent on the open access resource.

It is not enough merely to assign the property rights; it is of major importance to whom they are allocated: assigning or reallocating initial property rights affects income distribution. This is precisely why property rights are so crucial to the understanding of the link between poverty and the environment. If the poor, who are victims of a negative externality, are assigned the property rights over the resource (such as clean water) then both efficiency and income distribution will improve. If the polluter is assigned the property rights, efficiency improves but the income distribution will suffer; or to put it plainly, the environment will improve and poverty will increase.

The Effect of Externalities on Poverty

The fundamental environmental problem is that the prices of goods do not reflect their social costs due to externalities. In the following sections externality problems and their solutions are presented. Moreover, the problems and solutions are analysed from a poverty perspective.

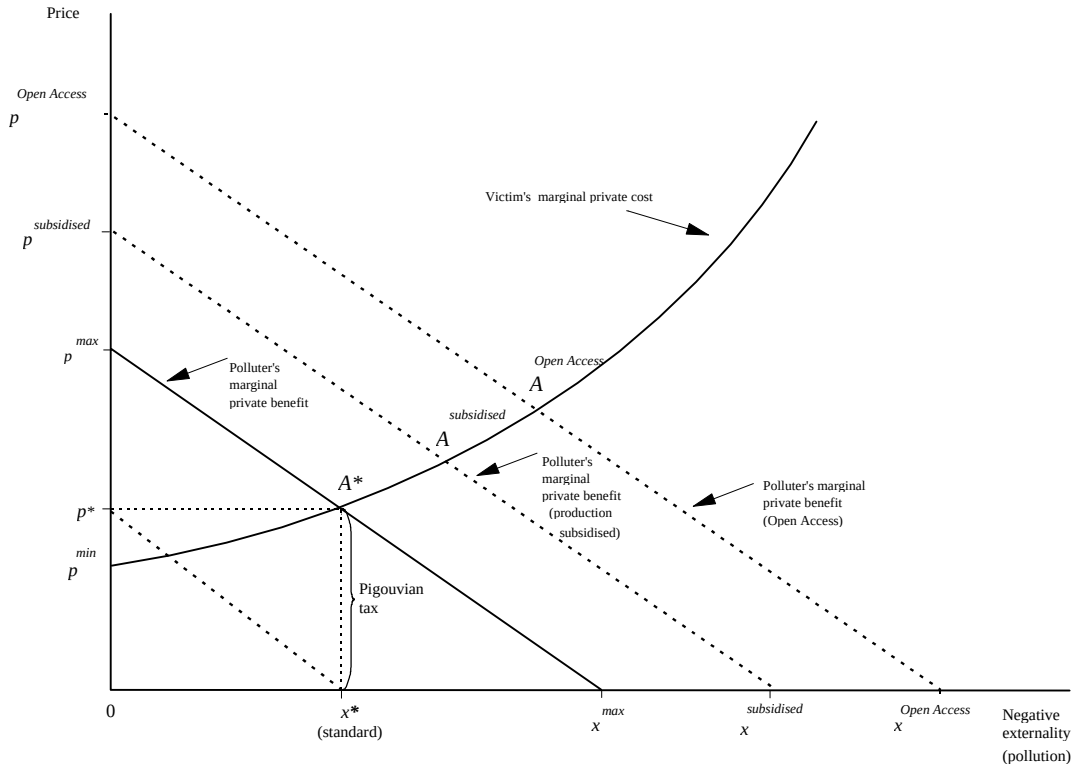
Unidirectional Externalities and Poverty

To illustrate the case of unidirectional negative externalities, it is first assumed that the producer can use the environmental resource without restrictions. In other words, the producer does not have to pay for using the environmental resource and thus is not constrained by the amount of unidirectional externality he can produce. The producer will in this case emit as much pollution as is beneficial for him. The producer's marginal private benefit of polluting is shown in Figure 2.1. At point x^{max} the marginal benefit of polluting is 0 and the producer would not gain anything from polluting more. At x^{max} the production is optimised, however, without taking into consideration the environmental effects. An example of this kind of behaviour is a farmer using pesticides and fertilisers without taking into consideration how much will be washed away from the soil with rainwater to the river or lake. The farmer would use just the

amount of agricultural inputs that would be profitable for him or her even if other people using the river or the lake would suffer.

The suffering of the victims, or the marginal private cost,[7] has also been shown

Figure 2.1 Three approaches to solve the problems due to unidirectional externalities



in Figure 2.1. This is the amount that the victim would be willing to pay to the producer so that he would cut down the externality (i.e. the excessive use of pesticides and fertilisers). This can also be expressed as the amount of compensation that the producer should pay to the victims for the right to let the fertiliser and pesticide residuals contaminate water.

The social optimum A^* is where the marginal benefit of the polluter and the marginal cost of the victim are equal. The farmers reduce the externality to x^* – which is the amount of pollution that the users of river and lake water would find acceptable – and the farmers can use some pesticides and fertilisers.

The reduction of unidirectional externalities to an optimal level can be achieved using three different, albeit not necessarily mutually exclusive approaches. The social optimum A^* can be reached by:

(i) establishing and monitoring a standard (the «Command and control» solution);

(ii) setting a tax on the externality (the «Pigouvian» solution) ; or

(iii) establishing or reassigning the property rights on the use of the environmental resource (the «Coasean» solution).

Command and Control Solution

Society can set a standard or a norm, x^*, above which the polluter cannot produce externality. This is the level of externality that the society sets (i.e. «commands») and enforces or monitors (i.e. «controls»). An example of such a standard is when farms are not allowed to let more than 70 kilograms of nitrogen per hectare to leak from the farm to the surface water. Governments, regional and local authorities use predominantly «command and control» to regulate environmental problems mainly because it is administratively simple.

A very important drawback of the «command and control» approach is that it often tackles the environmental problem inefficiently. There are three reasons for this. First, the regulator does not know how much or little the producer gains by being able to pollute, i.e. the regulator does not know the marginal benefit of the polluter. In other words, the regulator does not know how much the producer would be willing to pay for the right to pollute. Second, the regulator does not know how much the people suffer from pollution. In particular, the regulator does not know how much the people would be willing to accept compensation for the fact that they receive pollution. In other words, it is very difficult for the regulator to know the marginal private cost of the negative externality. Finally, even if the regulator knew both the marginal benefit and cost curves, it would have great difficulty monitoring that the norms have been obeyed. In other words, the regulator would have difficulties in measuring, for example, how many kilograms of nitrogen has leaked from the farm.

Pigouvian Tax Solution

Pigou (1920) was the first to suggest that the society makes the polluter pay a tax so that his marginal benefit from producing negative externality is zero at point x^*. The amount of tax would be the distance between p^{max} and p^* in Figure 2.1. This tax was not intended for raising fiscal revenue but to internalise the cost of pollution. However, most – if not all – of the taxes raised with a claim that they are environmentally justified are in fact not Pigouvian in nature because they are not based on the externality but rather on fiscal considerations.

One problem in the Pigouvian solution is that even *if «the Pigouvian analysis shows us that it is possible to conceive of better worlds than the one in which we*

live ... the problem is to devise practical arrangements which will correct defects in one part of them without causing more serious harm in other parts« (Coase 1960:27). In effect, the »double dividend» argument[8] is a reverse of this. Another problem with a (Pigouvian) tax is that it is confined to a tax on the producer for damage caused. The potentially much lower costs of the prevention of the damage are omitted from these calculations. This would not be a problem if the tax on the externality was set optimally. However, if regulatory authority has little information of the damage caused, it may set a higher tax than would be necessary from the victims point of view.

A particular problem with a Pigouvian solution is that if the tax is not set optimally, it will be distortionary. In addition, the fiscal considerations may dominate in the collection of the tax and the environmental tax has a danger of becoming one tax among the others. Although in theory it is possible to devise a Pigouvian tax that is non-distortionary, Heal (1993) points out that it is seldom considered how the tax itself will be used in a non-distortionary way.

Coasean Property Rights Solution

The property rights of the environment could be defined so that the preferences of the polluter and the victim are taken into consideration. This solution, first suggested by Coase (1960), would entail a bargaining process that would lead to point A^*, i.e. the optimal level of pollution.

The equivalence between the Pigouvian and Coasean solutions can be illustrated. The government could set a Pigouvian tax of p^{max}-p^* and thus lower producer's marginal benefit curve (shown as a dashed line from x^* to p^*). Thus, the producer's optimal pollution point would move from x^{max} to x^*. In the Coasean solution the producer would compensate the victims whereas in the Pigouvian solution the producer would pay the tax to the government. The government could redirect the Pigouvian tax to compensate the victims (although according to welfare theory this should not occur). As Pigouvian taxes are seldom used in practice – and due to other reasons, such as the dislike of earmarked taxes of the ministries of finance[9] – there are few real world examples of this solution.

Equivalence of Command-and-Control, Pigouvian and Coasean Solutions

In theory, the «Command and Control», «Pigouvian» and «Coasean« solutions are equally good, but in practice any solution is difficult because it is often impossible to know what the marginal benefit and marginal damage costs are. In particular, it is impossible for the society to know the marginal benefit function of the polluters because the producers have no incentive to reveal this. If they

were required to do so, they would have an incentive to give incorrect information, i.e. to exaggerate the benefits of polluting activities or the costs in pollution abatement.

If amount of negative externality can be measured and monitored, the Coasean solution would be the establishment of pollution markets, as has been the case in reducing sulphur pollution in the USA. This market for emission permits is a combination of «command and control» and «Coasean» solutions. An overall quota first calculated, for instance so that the carrying capacity of the ecosystem is not exceeded and then this quota is allocated for each polluter. After the allocation of the quotas, the polluters could sell and buy the parts of the quotas (or permits) to one another. The victims, or the government on their behalf, could buy permits from the market thus making it more expensive for the polluters to produce the externality. The advantage is that the government does not have to know the marginal benefit and damage costs.

Market based approaches are generally favoured by economists[10] over «command and control» (Oates and Cropper 1992) because market based approaches require less information. Because information in the real world is imperfect, economic instruments have the important advantage of economising on the need for the government to acquire information on the abatement costs of the producers of negative externality. This is also an example of the capacity of markets to generally deal efficiently with information problems.

Removal of Subsidies to Inputs may Improve the Environment and Poverty

Figure 2.1 illustrates what happens if the production of the good that provides negative externality is subsidised by $p^{subsidised}$-p^{max} . Examples of this can be found in agriculture and industries where the prices of inputs, such as pesticides, fertilisers, irrigation water and energy are subsidised in many developed and developing countries. As the subsidy increases the production of the good, the marginal benefit curve of pollution will shift out, and the amount of pollution will increase to $x^{subsidised}$.

If the victims had the property right of the environmental resource they would be willing to bargain with the producer and accept more pollution with a higher price. The mutually acceptable point would be $A^{subsidised}$. The victims are still worse off because of the subsidy, but obviously not as bad off as if they had no bargaining power.

A change in the Indonesian government's policy to reduce subsidies in crop production is a good example to illustrate how the removal of agricultural subsidies improved the environment. As part of an extensive integrated pest

management programme, the government abolished subsidies to pesticides and banned a number of insecticides in 1986. The effects were dramatic. In 1991, because of the rise of the pesticide price and the improved knowledge of applying different pest control methods, pesticide use had fallen by 60% compared to 1986. However, rice production had increased by 13% during the same period (UNRISD 1995 based on FAO 1994). Thus, the government was moving the marginal benefit cost of pesticide application from $x^{subsidised}$ to x^{max} (Figure 2.1).

Although there are no figures available concerning how the change in prices affected the welfare of poor farmers, it is likely that they benefited from the change in two ways: first, due to the increase in production and second, from the reduction in exposure to pesticides. However, there is still room for improvement because a removal of subsidies will only bring the situation to x^{max} (Figure 2.1) whereas the social optimum would be at x^*.

Polluter-Pays-Principle

The 'polluter-pays-principle' means that the polluter should pay for polluting the environment.[11] The polluter-pays-principle contains implicitly the notion that the victim has the property right of the natural resource. This principle is illustrated in Figure 2.1. If the victim of the externality has the property right over the resource (e.g. clean air or water) the producer would pay him compensation of the area between 0, p^*, A^* and x^* for the right to produce negative externality at x^*.

The amount that the victim would require as compensation is depicted at the marginal private cost curve and the amount that the polluter is willing to pay is depicted by producer's marginal benefit curve. Even if the polluter paid the area between 0, p^*, A^* and x^* he would still be clearly better off than having no possibility to pollute: at x^* he gains the triangle depicted by p^{max}, A^* and p^*. With the compensation, the victim would also gain the triangle depicted by p^*, A^* and p^{min} . The area depicted by 0, p^{min} , A^* and x^* is the damage that the victim would be compensated for by the polluter.

Relevance to Poverty

As the poor are often victims of unidirectional negative externalities, the internalisation of environmental costs would work in their benefit while encouraging simultaneously sustainable development. Thus, sound

environmental management is usually pro-poor in the short term whereas it is surely pro-poor in the long term.

From the poverty viewpoint, a well implemented «command and control» scheme can be beneficial in the sense that the living standard of the poor, who are usually the victims of negative unidirectional externalities, can rise because they receive less pollution than without intervention (i.e. less than x^{max}). However, if the scheme is implemented using norms that are much stricter than their marginal willingness to accept compensation (i.e. to the left of x^*) would imply, both the poor victims and the producers would be worse off.[12] The producers would face an unnecessarily strict norm and would not produce at optimal level (and risk bankruptcy), whereas the poor would suffer due to the loss of economic efficiency, for instance because of reduced direct and indirect employment opportunities.

In developing countries, the risk in «command and control» is that the norm is set too loosely allowing the producer to pollute much more than what would be socially optimal. In this case the government or regional or local authority gives the producer an implicit subsidy because the producer does not have to bear the full cost of its production. The society picks up the bill through, for instance, increased mortality and reduced labour productivity due to illnesses, increased health care costs, increased prevention and cleaning costs. It should be noted that most of these increased costs are not born by the government but by the victims themselves, who are mostly from the poorer strata of the society, such as sharecroppers, small landholders or tenants, the forest dwellers or the fishermen (Dasgupta and Mähler 1994).

Box 2.1 illustrates a successful policy change to internalise negative externalities of palm oil industry in Malaysia in the end of 1970s: it was possible to decrease the negative externality caused by the crude palm oil mills, yet simultaneously increase palm oil production and reduce poverty.

Box 2.1:

Successful internalisation of negative externalities of palm oil industry in Malaysia

In 1977, Malaysian crude palm oil (CPO) production was 1.6 million tons having a 11% export share. However, the palm oil mills had become the worst source of water pollution. The quantity of organic wastes discharged was the equivalent to pollution generated by a population of more than 14 million people[13] (Khalid 1995). The palm oil industry was thus receiving an implicit subsidy given by the population and, in particular, the vulnerable population depending on surface water.

From 1977 the palm oil industry was regulated through a system of license fees on effluent discharge and the application of effluent discharge standards.[14] The CPO mills had to reduce their organic waste discharge by 98% in six years. Since the introduction of the new policy, CPO production continued to grow by 12% between 1978 and 1989, and effluent generation by 11%. From 1978 to 1982 discharge was reduced from 563 tons to 5 tons per day. Even if palm oil production and effluent generation continued to grow, discharge has been kept at the same level of 5 tons per day.

With the new legislation, the palm oil mills had an incentive to find a solution to the organic waste problem. The regulation incurred additional costs to the industry, because of the need for treatment systems to be installed, but they were low, only 0.2% of total production costs. The producers were not able to transfer these costs to prices because of intensive competition in the world market. However, the mills were able to shift the cost to the palm grower, because they had some market power. Thus, the competitiveness of the industry was not impaired by the regulation but the small cost was borne by the growers.

The palm oil industry was able to find commercial by-products of oil mill residue: animal feed and fertilisers, and electricity generation from methane gases. The relatively cheap fertiliser partly compensated the palm tree growers for the negative price effect. In 1984, four mills had found uses for all their effluent and had zero discharge. It is important to note that in this case the Government provided a major boost to research and development of treatment of palm-oil waste by establishing the Palm Oil Research Institute of Malaysia in 1980.

The effluent standards contained in the Malaysian regulation were the key to the reduction of discharge, although license fees on effluent discharge could have been an effective environmental policy instrument, as well. The effluent discharge fees and standards were not made by estimating marginal benefit and damage costs, because such information was not available. This case shows that even with limited information, government can initiate sound environment management policies.

The Malaysian success was important from the poverty viewpoint on three counts. First, the negative externality was reduced and, since the poor were the main consumers of surface water, their welfare improved. Second, the palm oil industry continued to grow and, in 1989, it was providing direct employment to about 200,000 rural families and 120,000 estate workers. In addition, it provided indirect employment to the trading, processing and manufacturing sectors. Third, the cost of effluent treatment was small, but it was shifted to the palm growers. Thus, the welfare of some of the poorer growers was slightly reduced.

Link between Reciprocal Externalities and Poverty

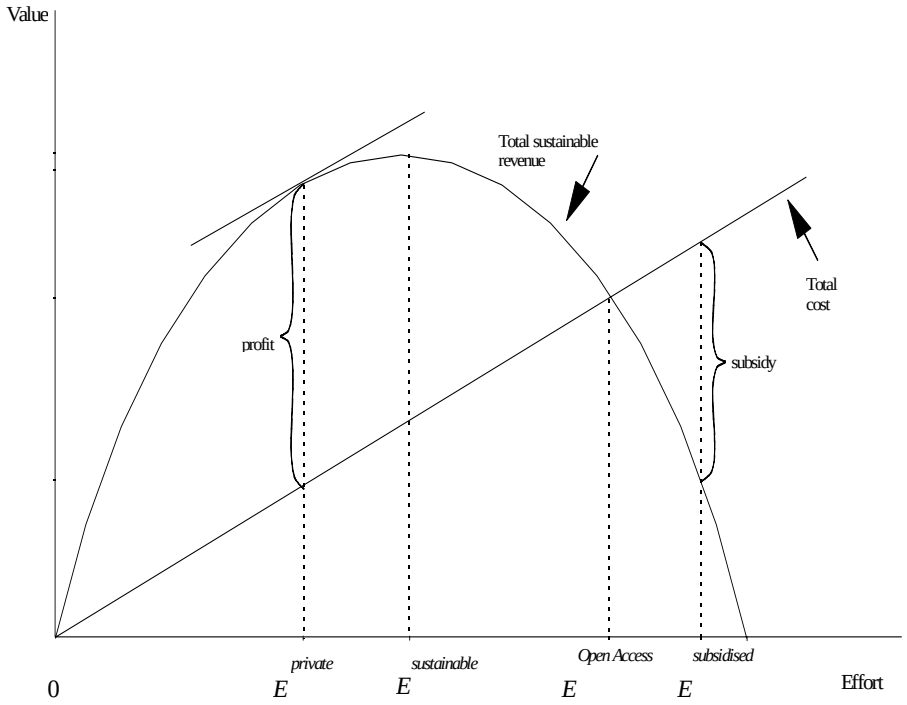
Reciprocal externalities

Many environmental resources are subject to over-exploitation because of the access to use these resources is practically unlimited. Fisheries[15], forests and public roads are examples of open access resources which are often over-exploited because the rights of their use have not been clearly defined. In the open access case, the harvester's cost of extracting an additional amount of environmental resource is relatively low, reflecting only the opportunity costs of the inputs (which are mainly labour in many developing countries) used to extract the resource. These costs do not reflect the full impact on other harvesters' possibilities to extract resources. A unit extracted decreases the stock available to others and may increase their extraction costs (e.g. the amount of time).

This «tragedy of the commons», first introduced by Hardin (1968), is illustrated in Figure 2.2 which shows the total sustainable revenue and total cost of the harvesting of a renewable resource. All points on the total sustainable revenue curve are long term bioeconomic equilibria. The maximum sustainable yield of a resource is indicated by $E^{sustainable}$. This is from a biological point of view the amount that should not be exceeded. If the resource was owned by one person or firm, they would maximise profit – i.e. revenue minus cost – by harvesting the resource at $E^{private}$ which yields a lower harvest than $E^{sustainable}$.

Figure 2.2 thus contains a very important message: the optimal amount to be extracted using profit maximising criteria is less than the maximum sustainable yield or the biological criterion. In other words, a capitalist with a monopoly over the resource would set the optimal catch to a lower level than a marine biologist. The monopolist takes into consideration the costs of harvesting whereas the marine biologist ignores this.

Figure 2.2 "Tragedy of the Commons"



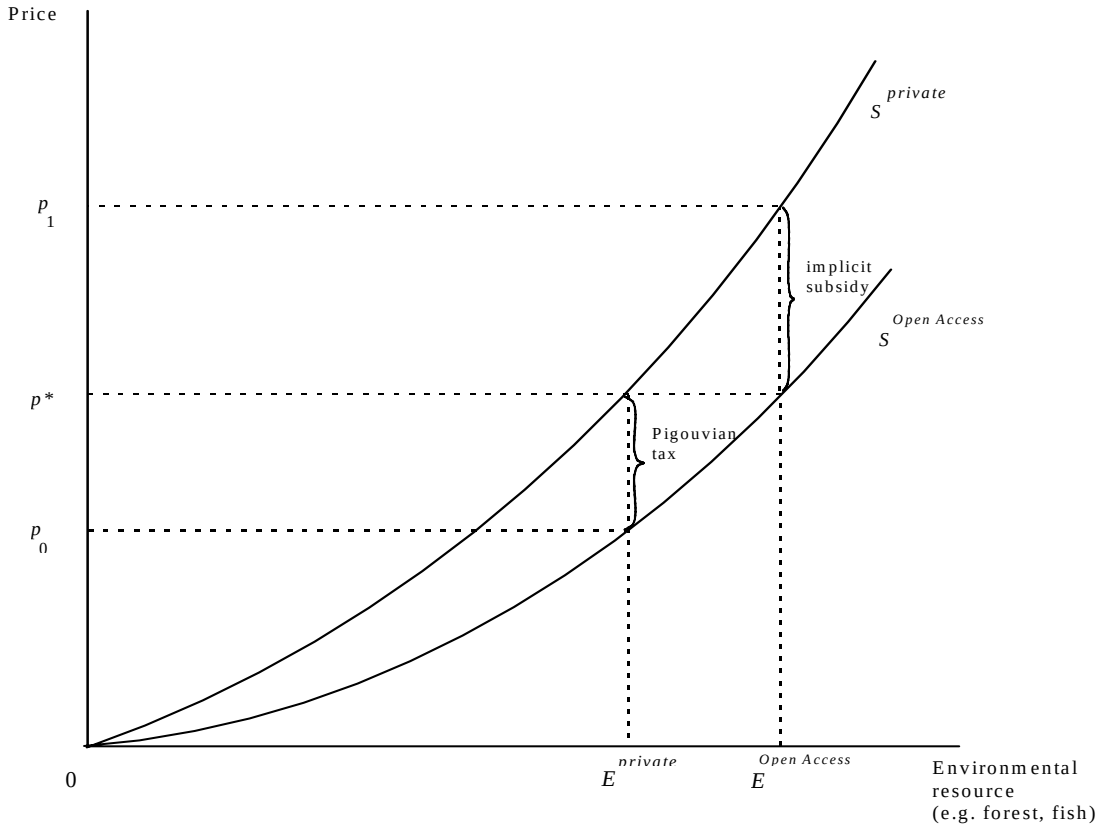
If the access to the resource is open to all, there is an incentive to other harvesters to enter to exploit the resource as long as there is even a small profit to make. The tragedy of the open access resource use is that everyone – the capitalist, the marine biologist, the poor and the environment – loses. In the open access case the extraction rate is over the maximum sustainable yield at $E^{Open\ Access}$. Figure 2.2 contains an additional point, $E^{subsidised}$, which illustrates what happens if the harvesting activity is subsidised. The amount of subsidy is the difference between the cost and the revenue.

The maximum sustainable yield $E^{sustainable}$ is in effect the guiding principle for many governments when regulating fisheries (although it should be $E^{private}$ as shown earlier). However, it is difficult to estimate the maximum sustainable yield accurately in fisheries because of unknown biological processes and measurement problems. For instance, the dynamic effects of the extraction of different kinds of fish in the food chain are not well understood. Also political pressures to raise the quota make the application of maximum sustainable yield difficult. Many of the collapses of fishing stocks are due to an overestimation of the maximum sustainable yield.

Chichilnisky (1994) showed that the problem of overuse of open access resources is equivalent to the supply curve shifting out (Figure 2.3). If the property regime is well defined, the externalities are fully internalised and thus, the harvester's extraction cost fully reflects the costs this imposes on the extraction by other harvesters. More formally the argument is that, if the

property regime is well defined, one harvester equates the relative prices of inputs and outputs to the marginal productivity. However, in the «open access» case with many producers, the relative prices are often equated to average productivity.

Figure 2.3 Supply of environmental resources under private and open access property regimes



If the ownership or the rights to use of the environmental resource are clearly defined and enforced, the owner(s) of the resource will supply the outputs of the resource (trees, fish etc.) according the supply curve $S^{private}$ which is the socially optimal curve. If the environmental resource is subject to open access, the harvesters will not take into consideration the effect of their action to other harvesters and thus, in aggregate, they will harvest and thus supply more of the resource. The supply curve shifts to the right to $S^{Open\ Access}$. At a given (world market) price p^* the harvesters supply the environmental resource up to $E^{Open\ Access}$ which is higher than $E^{private}$, the economical and environmental optimum. The biologically sustainable supply curve (not drawn) is between $S^{Open\ Access}$ and $S^{private}$. The implicit subsidy due to the overuse of the open access resource is $p_1 - p^*$. This is the difference between the world market price and the price that the supplier should receive for harvesting the environmental resource at $E^{Open\ Access}$.

This implicit subsidy is given by the owner of the open access resource, usually the government.

Relevance to poverty

Some observers blame the poor for overgrazing or overfishing the open access resources. However, Reardon and Vosti (1995) point out that while livestock is important to the poor, they cannot afford to own many animals. Following Christensen (1989) they point out that, for instance, the poorest tercile own fewer animals than the richer households in West Africa. If the income of the poor increases, but the open access resource remains the same, the poor may purchase additional assets (e.g. livestock or chain saws) and thus, increase the pressure on the environment. However, it is important to emphasise that the problem at hand is not due to actions of the poor but because of the open access nature of the resource.

Nuraain and Yaakub Johari's article in this book illustrates how poor, small-scale fishermen are the victims of the overuse of coastal fishing resources. One of the main factors in the persistence and increase in poverty in fishing communities in Sabah relates to the depletion of coastal fishery resources. This is due to the overfishing of trawler boats, harmful fishing techniques and the deterioration and destruction of mangroves, coral areas and other coastal resources. The Department of Fisheries of Malaysia is regulating the number of fishing trawlers and the fishing areas. Thus, the government has *de jure* property rights on the coastal fisheries, but trawlers do not respect these and encroach frequently upon the coastal areas. Thus, the poor, local fishers are victims of environmental degradation and suffer from the growth in the use of the *de facto* open access resources as well as because of the negative externalities related to the destruction of mangroves and coral reefs.

Figure 2.3 illustrates the environmental problems due to open access at national and international levels. From an individual (small) country viewpoint, the world market price p^* is given. Some arguments have been put forward that the unsustainable use of forest resources in developing countries should be tackled by levying a tax on the products. In Figure 2.3, such a Pigouvian tax p^*-p_0 and the corresponding producer price p_0 are shown. With the tax, the producer of an open access resource would cut down his or her effort and cut less forest according to his supply curve $S^{Open\ Access}$. The tax would make the producer supply at point $E^{private}$.

Although a controversial issue, it is likely that a reduced timber price will reduce deforestation. The tax may, however, not be a first best solution, and have some drawbacks. For example, a tax at the international level would treat

all producers - sustainable or unsustainable - equally. The problem is in the reciprocal externalities created by the open access situation of forests in particular countries. Therefore, the remedy should be sought at that level by reallocating the property rights.

What would be a property rights solution to the problem of reciprocal externalities? The standard «Coasean» solution would be to place the forest land under the same legal entity as the people who suffer from the externality. Thus, the logging firm or another entity should buy the forest land as well as the land that is in its watershed. Moreover, the government would enforce the sustainable use of forests in the sense that soil erosion would not be permitted and proper watershed management would be imposed. The idea of making the logging leases very long (for instance 50 years) is a partial attempt in this direction.

Whereas this solution may be in accord with basic theory, it entails, nevertheless, a number of problems which are discussed below. The other standard property rights solution would to give the forest land as well as the watershed to the people who live in the area. The villagers would then negotiate with possible loggers on the terms concerning how much logging is allowed.

The «Coasean» solutions can be opposed from different viewpoints. In the following, some examples of opposition are given with counter-arguments. The main one in the first property rights solution is that the government would lose part of its power or sovereignty if it sold the forest land instead of leasing a logging concession. Actually, the difference from the government viewpoint is smaller than it seems. If the government sold the land it would actually cash in the future rents of its yield but it would not lose its sovereignty: it would still have the right to regulate the use of both private and public land. However, in a concession the government needs to monitor that the wood extraction is sustainable (so that at the end of the lease period there would be a stock of wood left), whereas if the land were sold the incentive for sustainable use would be with the firm. The simple but extremely important point is that the logger treats a logging concession differently than it treats a piece of private property. If the government sold the land, the logger would no longer treat the forest as an open access resource but as a sustainable asset. Thus, the logging company (being a capitalist monopoly) would move its extraction to point $E^{private}$ in Figure 2.2. If this would not happen, it is likely the logging company probably thinks that it can get a cheaper concession somewhere else. The government can influence this, however, by coherent policy and by regulating the use of land.

Another source of opposition to the first standard property rights solution is the plight of the inhabitants whose land would be sold to the logging company. However, the funds that the government received from the sale of forest land could be diverted to the affected people. The people could use the funds to

repurchase their land or rent it from the logging company. There would, however, be a number of political and administrative obstacles to such a solution.

If all the funds were diverted to the inhabitants this would be very close to the second «Coasean» solution, i.e. giving the forest land and watershed to the inhabitants. The likely opposition to this suggestion stems from the «windfall» income that could come to the inhabitants of the area. The idea of windfall profits can be countered by asking how much of the natural assets the people would actually sell to logging companies. Moreover, the government can tax village income. It goes beyond the scope of this Chapter to describe the details, including the institutional set-up, that the property rights solution would entail. The point illustrated here is that the poverty alleviation aspects can well go hand in hand with solving the problems of the open access natural resources.

The Effect of Reciprocal and Unidirectional Externalities on Poverty

Combined Effect of Reciprocal and Unidirectional Externalities

Open access resources are subject to reciprocal externalities. In addition, some open access resources provide positive unidirectional externalities to their environment. For instance, forests keep the water tables high, prevent erosion, maintain biodiversity and act as buffers for water. However, if forest is an open access resource there is a tendency to overuse it, which is wasteful in itself. Moreover, the negative unidirectional externalities of cutting down forests are not taken into account either. This combined effect shifts the marginal private benefit curve in Figure 2.1 further out.

If the forest was private (or, strictly speaking, not *de facto* or *de jure* open access), the owner of the forest would cut wood without taking into consideration the negative unidirectional externality of his or her action. The owner would cut forest and cause negative externality (e.g. erosion, increased floods, loss of biodiversity and less absorption of CO_2) up to point x^{max} in Figure 2.1.

However, if the forest was open access, the combined effect of foresters would be to cut even more wood and consequently cause more negative externalities. This is illustrated by point $x^{Open\ Access}$ which shows the worst case of environmental degradation: the victims of externalities of the subsidised[16] overuse of an (effectively *de facto*) open access resource have no power to regulate the use. The society as a whole is losing large amounts of welfare. The current forest management practices in many developing countries unfortunately have these features. If the victims had the property rights for the resource (e.g.

the river of the watershed) they would bargain with the producers of the externality and come to point $A^{Open\ Access}$ in Figure 2.1.

Relevance to Poverty

The people who lack the property rights to the natural resources and who suffer from the externalities tend to be the poorest strata of any society. Thus, finding a solution to this both economically and socially unsustainable use of natural resources should be in the interest of any government.

The following example by Broad (1994) illustrates the poverty-related problems of open access resources with unidirectional externalities. In San Fernando, Philippines, 90% of 33,000 inhabitants were poor peasants who grew rainfed rice and maize. They did not have secure property rights (i.e. a title) to the land but they had managed to live off the land for decades without degrading the environment. In the mid-1980s, they witnessed drops in water tables and the erosion of topsoil, and the harvests were heavily affected. Some harvests dropped by 50%. Floods, which had not occurred earlier, started to emerge and farmers close to rivers lost their land due to erosion. The reason for this environmental decay was not their poverty but the action of outsiders: by that time 80% of the upland forests had been logged. The loggers treated their concessions with a short-term profit motive and effectively turned the forest into an open access resource. The poor farmers paid a very high additional price, because the loggers had not taken into account the affect of their action to the farmers. This example highlights not only the poverty-related problems of open access resources with unidirectional externalities. It also shows that, in the Philippines, environmentalism was demanded by the poor, not by the rich.

Conclusions and Policy Implications

Unclear property rights give rise to unidirectional and reciprocal externalities. Unidirectional negative externalities arise because the producer does not take into consideration the negative spillover effects of production. Reciprocal externalities arise in situations where nobody effectively controls the use of an open access resource. Negative externalities are the reason why market prices do not reflect the true costs of production or consumption.

As the poor are predominantly victims of environmental degradation, policies correcting the prices would also be in their interests. Therefore, governments

should set as their priority to implement policies that internalise the negative environmental externalities. This would be good both for the environment as well as the poor.

The poor depend on open access and common property resources more than the rich because they seldom have private property of any kind. Some 60% of the world's poorest live in ecologically vulnerable rural and urban areas. Thus, the management of open access and common property resources is crucial for any attempt to reduce environmental degradation and poverty simultaneously.

Subsidies to agricultural inputs or energy are often harmful to the environment. Moreover, subsidies tend to be harmful with respect to alleviating poverty because the richer farmers get the lion's share of the subsidised inputs and the poor suffer from the negative externalities of production. The removal of such subsidies has in many cases helped to improve the environment and to raise the living standard of the poor. Concurrently, the government has saved funds which can be used in other ways for the benefit of the poor.

The government itself does not necessarily need to directly implement many of its environmental policies. An appropriate government policy might simply be to set the rules and monitor them by providing and enforcing the necessary economic, environmental and social legislation and then leave their execution to the markets. An example of such policy is the allocation or redefinition of the property rights of natural resources.

As common property resources can often be well managed by the poor people themselves, governments should support this. For instance, as a practical solution for managing natural resources, governments could formally allocate to each community the property rights to fishing, forestry and other resources which are subject to open access. Thereby the government would recognise the community-specific regulatory practices. If there are additional problems because of ignorance and incompetence, the government could supplement this approach by information dissemination and by upgrading the skills of the people who would live off the natural resource.

Difficulties in the management of common property resources tend to be a problem for the external agencies, not for the users themselves. The users know which people are entitled to use the resource and to what extent. They also tend to have historical rights to the resource and use them in a sustainable manner. Moreover, the users of common property effectively monitor one another. Thus, the people manage common property much more efficiently from within than the local or regional authority or the government would ever be able to do.

The poor's heavy reliance on the environment provides a strong incentive to protect their surroundings. However, in the advent of outside intrusion--for

instance, because the government sold the logging rights, or due to technical change (chain saws), influx of people, or other kinds of population pressure--the common property resource is threatened. After the control mechanism breaks down, the well-managed common property becomes an open access resource to the detriment of the poor as well as the environment.

The contradictions between the property regimes should be resolved by ensuring the security of the tenure within environmental entitlements at the local level. This is a major policy challenge to governments and to regional and local authorities who can enact legislation to manage the use of joint common property resources. A potentially successful policy would be to specify and support traditional tenure rights within the statutory legal framework. Chitsike's article (in this book) about the CAMPFIRE programme in Zimbabwe illustrates a successfully implemented policy, where the government and the common property holders make a contract by which the poor are empowered and legalised to practice the environmentally sound management of natural resources. A similar approach could be used in managing pastoral areas in the drylands in many developing countries for the benefit of the environment and the poor.

It has been suggested that the poor overuse environmental resources due to a short time horizon (e.g. Holden et al. in this book). The evidence of this paper provides a complementary explanation. When overuse occurs, it can often be explained by other factors, such as land alienation, insecurity of land tenure, or physical insecurity associated with repression rather than by poverty.

This paper has argued that sound environmental policies would also alleviate poverty. However, the argument can be reversed: if a constant public eye is kept on the conditions of the poorest in the community, environmental resources would be protected and their sustainable use would be promoted best. Pro-poor economic policies are not desirable in themselves – they tend to be good for the environment.

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Notes

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[2] However, there are some indications of changes in this trend. For example, the IMF cancelled a $20m loan to Cambodia because of the country's failure to control loggers who are destroying forests (Economist 1996).

[3] The poorest were defined to be the poorest 20% of the population among the total population. It should also be noted that 'low potential' includes areas where the potential is not known because these areas have not been well explored (Leach and Mearns 1992).

[4] Dasgupta and Mähler (1994) have added an important point to the discussion of land property: density, i.e. the average value of the resource per land area, and predictability, i.e. the inverse of the variance of the value of the resource per unit of time per land area. Resource allocation theory predicts that communities are likely to institute a private property regime in high density, highly predictable land (such as river valleys) whereas in low density and unpredictable areas (such as semi-arid areas) communities would be dispersed and mobile. Also common property resource ownership regimes would be more prevalent in the latter case.

[5] There are both negative (e.g., pollution) and positive (e.g., gardens) externalities. However, this paper focuses only on negative ones because environmental externalities are predominantly negative.

[6] Actually, the Coase theorem has the following underlining assumptions: (a) the negotiating game is common knowledge among participants; (b) there are no transaction costs; (c) the game is well defined or convex; and (d) there are only two parties in the negotiation (Dasgupta and Mähler 1994). They concentrated on problems that arise due to non-convexities of the game due to endogenous and exogenous reasons. The former are dependent on economic and legal institutions, i.e. when a system of legal institutions suppresses another legal system the game is no longer convex due to endogenous reasons. Examples of exogenous non-convexities are economies of scale in production, non-linear dose-response relationships in the environmental impact of pollutants.

[7] This can also be called the marginal damage of externality. Note that in Figure 2.1 the marginal private cost curve has been drawn to start above zero indicating that even the first amount of pollution would be fairly damaging to the victim. If the assimilative capacity of the environment was high, the marginal damage curve should be drawn to cross the x-axis to the right of zero. However, the basic message would not change.

[8] The «double dividend» argument states that a government can raise taxes on environmental externalities and improve the environment (first dividend). At the same time the government can lower economically harmful or very distortionary taxes in other inputs, such as labour, and increase overall efficiency, employment, and national income (second dividend) while the total tax revenue is not reduced.

[9] In 1973, Japan established a kerosene tax of 26 yen ($0.25) per litre on all carries on national routes. Some 15% of the tax revenue is earmarked for the use of local self-governing bodies in the vicinity of the airports. Although under this scheme there is some compensation to the victims of aircraft externalities (noise), the setting of the tax is not based on the externality.

[10] Although economists prefer price instruments, this is not necessarily based on a critical analysis. In an important article, Weitzman (1974) analysed how uncertainty effects the choice between quantity based and price instruments.

[11] The opposite case is called the 'victim-pays-principle', implying that the victim should bear the cost of pollution or that the victim should «bribe» the polluter to cease polluting.

[12] If the poor do not suffer from the pollution or if they are not employees of the producer, they would not suffer in any particular way from environmental standards which were too strict. However, the producer would suffer in the same way as if there were other restrictions to produce goods efficiently.

[13] The discharge was 508 tonnes of biological oxygen demand (BOD) of effluent per day.

[14] The standard was set in four stages taking the BOD concentration as the key parameter. In 1978, the maximum concentration was 5000 mg/l of BOD, in 1979 it was 2000 mg/l and then it was reduced every year by 50 per cent until it reached 250 mg/l in 1982. In 1984 it was further reduced to 100 mg/l.

[15] The theory and modelling (e.g. Gordon 1954 and Hardin 1968) on open access resources have been developed using fishing population as the unit of analysis.

[16] There are several possibilities regarding subsidies to forestry: the subsidies to fuel prices to lower transport costs, as well as to fertilizers and pesticides for tree growing are some examples.

Chapter 3

Poverty and Myopia: A Study of Time Preferences among Rural Poor[1]

Stein T. Holden,[2] *Bekele Shiferaw* and *Mette Wik*

Introduction

Problems of poverty and environmental degradation in developing countries are closely linked (WCED 1987; Mellor 1988). The majority of the poor live in rural areas and derive most of their income from soil and forest resources (World Bank 1990; Dasgupta 1993). It has been claimed that poverty may lead to short planning horizons which may prevent poor farm households from investing in conservation to protect their natural resource base (Mink 1993). Yet there have been very few empirical studies of the planning horizons or rates of time preference (RTPs) among rural poor. It is also frequently stated that insecurity of land tenure is a major reason for environmental degradation. Peasants are not likely to invest in land conservation if they are uncertain that they will derive benefits from their investments. Thus, provision of secure property rights to land is commonly proposed as the instrument to induce peasant farmers to invest in land conservation (Cruz and Gibbs 1990, Feder and Feeny 1993).

The causal relationship between poverty and RTP can be questioned. Is the causality in the opposite direction? Is it rather high RTPs which lead to low investment and poverty? In this case, trickle-down effects from economic growth would not reduce the market failure ("intertemporal externality") effect of high private RTP. On the other hand, if there is a causal relationship between poverty and RTP, poverty reduction itself would reduce this externality. Pender (1996) has tested for this effect in a study of RTPs of Indian peasants and could not reject the causal relationship (wealth being the cause).

Pender and Walker (1990) found in their study in India, using experimental games with real payoffs and hypothetical questions, that the RTP was inversely related to the level of wealth of peasants. Mean rates ranged from 30 to 60%, considerably higher than interest rates on debt outstanding. One third of the sample had RTPs above 100%. A proportional 10% increase in net wealth was accompanied by a 3-7% fall in the estimated rate of time preference.

This study is a by-product of research on causes of environmental degradation in three countries. The main objective is to provide additional evidence on the importance of high RTPs among rural poor and to investigate factors influencing or being correlated with the high RTPs. High RTPs can be a potential disincentive to investment (Deaton 1991), thus also to investment in conservation, even when property rights are adequately secure. In our case study areas, rapid environmental degradation was taking place even though the farm households appeared to have secure rights to land. In Ethiopia, Shiferaw and Holden (1998) found a negative correlation between RTPs and adoption of conservation technologies. An applied farm household model for the Ethiopian

highlands clearly illustrated how sensitive benefit-cost ratios are to the RTP (Shiferaw and Holden 1997). Variation in land tenure security was not apparent in the study areas and could therefore only be included as a precondition. The level of poverty/wealth in different asset categories may be important in economies where markets are highly imperfect (Reardon and Vosti 1995), as well as different household characteristics including risk preferences. The question of direction of causality was also tested carefully in one of the case study areas (Indonesia).

In section 2 we discuss relevant theories on market imperfections, particularly in credit markets, and their implications for personal RTPs. In section 3 the methodological approach to the empirical studies is presented. Section 4 presents empirical results and discusses the case studies in Indonesia, Zambia, and Ethiopia. In section 5 we conclude.

Market Imperfections and Time Preferences in Rural Economies

In a theoretical economy, with perfectly functioning markets and perfect information, the market mechanism should ensure optimal investment levels also in conservation. Environmental degradation takes place only when it is economically optimal to let it happen. In such a theoretical economy, there are no externalities because they are automatically internalised through the perfect markets. The market rate of interest would equal the intertemporal rate of substitution (RTP). In the real world, however, and in particular in rural areas of developing countries, markets are far from perfect. Market imperfections exist due to high transactions costs and imperfect information. Markets may be missing entirely, seasonally (partly missing), selectively (rationing), or may be very thin (imperfect competition). These market imperfections are particularly common in relation to land resources, labour, credit, risk/insurance, and some basic food commodities (Hoff et al. 1993; de Janvry et al. 1991; de Janvry and Sadoulet, 1992). Imperfect information and high transaction costs may also lead to inter-linkage of markets, like in share tenancy (Cheung 1969; Stiglitz 1974). Asymmetric information leads to problems with adverse selection,[3] e.g., in credit, insurance and commodity markets (Akerlof 1970; Rotchild and Stiglitz 1976), and moral hazard,[4] e.g., in land, credit and insurance markets (Arrow 1963; Hoff et al. 1993).

Of particular interest in this paper is the widespread empirical evidence that small farmers in most third world countries face credit constraints. Their freedom of choice may also be severely limited by subsistence requirements.

Credit rationing in formal credit markets may be explained by adverse selection and moral hazard (Stiglitz and Weiss 1981). Informal credit markets in rural areas of developing countries are characterised by very high interest rates, which may be related to high default rates and risk to the lender (Tun Wai 1958; Bottomley 1975), or by her/his monopoly power (Bottomley 1964). There have been many interventions in credit markets, e.g. through setting ceilings on interest rates and by channelling funds to rural financial markets. Most of these attempts have failed. This is evident from the fact that only 5% of farms in Africa and 15% of farms in Asia and Latin America have had access to formal credit (Hoff et al. 1993). The distribution of formal credit is also severely skewed as 5% of the borrowers have received 80% of the credit. High interest rates found in informal credit markets are also evidence of high rates of time preference.

Credit market failures have important economic implications. First, liquidity constraints lead to a non-separable relationship between household production and consumption decisions. This means that a premium (additional "invisible" cost) is placed on activities relaxing this constraint. The same premium is placed on activities using credit, thereby limiting their level of production or use. Credit constraints may reduce investments in risky, cash-demanding activities (Masson 1972; Eswaran and Kotwal 1990). Poor peasant households may thus appear more risk-averse than they really are.

Second, market imperfections in credit markets cause the link between interest rates and time preferences to be tenuous or disconnected (Binswanger and Rosenzweig 1986; Pender and Walker 1990). Thus, interest rates do not convey complete information on time preferences.

In conventional neo-classical economics the trade-offs between outcomes occurring at different points in time have been explained by the discounted utility model. We define the rate of time preference (RTP) as the consumption rate of interest (CRI) or the intertemporal marginal rate of substitution. A high rate implies that consumption today is given high value relative to consumption in the future. In this case, returns to investments must be at least as high as the RTP for this myopic person to be willing to invest.

Wealthier individuals are likely to have better access to, and face lower interest rates in credit markets than poorer individuals. Therefore, we expect that wealthier people would tend to have lower rates of time preference. We also expect people facing severe cash constraints to have higher RTPs than people facing less severe cash constraints. Furthermore, households with better investment opportunities (higher interest rates) are likely to have higher RTPs.

A large gap between private and social rates of time preference may call for concern and policy intervention. Pearce and Warford (1993) have argued that values of the pure rate of time preference should not be assumed to be relevant for the calculation of the social rate of time preference when environmental degradation is taking place and incomes are stagnant or falling. We argue that a large discrepancy between social and private rates of time preference may represent market failures of relevance for environmental policy.

Unconditional provision of credit may in some cases result in more rapid environmental degradation, since the credit is not necessarily used for investment in environmental conservation. However, more rapid resource degradation could be optimal unless it is due to policy-relevant market-failures (e.g. "intertemporal externalities"). This may point in the direction of careful targeting if credit is used as an environmental policy instrument.

Methodology

Survey Methodology

Surveys were carried out in rural villages in Indonesia, Zambia, and Ethiopia. Average incomes were low in all locations and natural resource degradation was prominent (Holden et al. 1994; Holden et al. 1995; Shiferaw and Holden 1997). The subjects interviewed were heads of households or other adult household members. Hypothetical questions were used to estimate the RTPs. The methodology was similar in the three cases, hence facilitating comparison. The use of hypothetical questions has been shown to have methodological weaknesses.

A standardised methodology was used to reduce these problems. In all questions, we used the same time frame of one year. In Indonesia and Ethiopia we used a cash value indicating that there may be a need to correct for inflation. In Zambia both cash and food (maize) were used as measures. The question asked was:

> "*If you were told you have the choice between an amount of money today (PV) and the amount FV in one year, how large would the amount PV have to be for you to prefer it instead of FV in one year*?"

The cut-off point was then identified and interpreted as the point of indifference. No specific procedure was prescribed to arrive at the point of indifference. If FV=100, the respondent was asked whether she preferred PV=100 to FV=100. If

yes, she was asked about the preference between PV=90 and FV=100, etc., until the point of indifference was identified. Alternatively, with FV=100, she was asked whether she preferred PV=5 to FV=100. If no, she was asked about the preference between PV=10 and FV=100, etc., until the point of indifference was identified. Information on the methodology and sample areas is presented in Table 3.1. Besides the hypothetical questions, data were collected on household characteristics, production, consumption, income, expenditure, savings, etc. for every household.

Variable	**Indonesia**	**Zambia**	**Ethiopia**
Inflation rate (%)	9	25-100*	10
Total Income per capita (US$)	107	108	196
Cash Income per capita (US$)	100	72	72
Subsistence Prod. Value per Capita (US$)**	7	36	73
Food Purchase Value per Capita (US$)	64	16	27
Food Self-sufficiency Ratio***	0.1	0.7	0.73
Environmental Problems	Deforestation Soil erosion	Deforestation	Soil erosion
Preference study			
Unit of consideration	Money	Grain/Money	Money
Time frame	1 year	1 year	1 year
Value magnitude, (%) of average household annual income	4	1-10	4
Average Present Value Equivalents (US$)	20	6, 42, 50	23

Table 3.1: Basic survey and methodological data

* *The inflation rate was sharply falling during 1993-94 in Zambia due to a severe monetary restraint put in effect in 1993 after a period of hyper inflation.*

** *The market value of subsistence food production.*

*** *The ratio between the value of subsistence food production and value of total food consumption*

Sampling Procedure

Indonesia

The survey was carried out in two transmigration settlements in Seberida, Riau Province, Sumatra. The transmigrants had been provided secure rights to their individual two hectares of land by the state. The level of poverty (64% of the population was estimated to be below the poverty line) and seriousness of environmental degradation (severe soil erosion, rapidly declining yields) have been documented by Holden et al. (1995). Both settlements were inhabited by Javanese transmigrants 5-10 years before our survey. We would therefore expect no cultural differences between the two areas. A difference in average RTPs between the two areas would consequently be an indication that these rates respond to differences in local conditions and would, therefore, be an indication of the direction of causality. This is particularly the case if the difference between the two areas can be explained by specific variables which vary systematically among individuals in the two areas. One of the settlements had relatively good market access while the other had very poor market access. The two settlements were both characterised by having poor land quality although the land was somewhat better in the area with poor market access. Poverty was most severe in the area with poor market access. The level of food self-sufficiency was low in both areas but higher in the area with poor market access.

The credit market was not well developed. Informal credit was almost unavailable due to the low creditworthiness of transmigrants under prevailing economic conditions (lenders' risk explanation for credit rationing). Land titles had only recently been issued and use of land as collateral had not yet developed. Some sale of land holdings had taken place although such practices were illegal.

A stratified random sample of 41 households was surveyed in 1991/92 to generate the data used in the analysis.

Zambia

The survey was carried out in six rural villages in northern Zambia. Three villages were located in a fairly densely populated area (26-82 persons/km^2) near the provincial capital, Kasama. The situation in these villages has been thoroughly documented in Holden (1988; 1991). Deforestation, due to shifting cultivation, was taking place at a rapid rate. Shortening of fallow periods and use of acidifying fertilisers caused a decline in yields or total crop failure for some crops (finger millet and groundnuts). The remaining three villages were

located in an area with low population density (<6 persons/km^2) and poor market access. Deforestation had also started in this area. Traditional rules regulated land use although all land officially was state property. Village land, including fallow land, was in general controlled by individual households and inherited in a matrilineal system (Richards 1939; Schultz 1976; Holden 1991). Sale of land was prohibited. Land disputes were resolved by village committees, the chief, or local courts. Security of tenure appeared to be good as individual households could exclude other households from their fallow land. The formal credit market was rationed and commodity specific (fertiliser and maize seeds) (Holden et al. 1994; Tviland 1996[5]). Informal credit markets were very limited.

The survey was carried out in 1994. Fifty households were sampled from each area, giving a total of 100 households of which only 86 could be used for the analysis.

Ethiopia

The survey was carried out in a location with relatively high agricultural potential and good market access (Ada district some 20 km from Debre Zeit, a town situated about 45 km southeast of Addis Ababa). Commodity specific (fertiliser) formal credit was available at 10-12% interest. Relatives may provide some credit without interest. The village money lenders charged up to 70% (continuous time rate). Someone's guarantee and/or asset ownership (especially oxen) was needed to qualify for informal credit. Crops were also sometimes used for borrowing and payback at the same rate of interest as credit in cash. The state is officially the owner of all land, but individual user rights appeared to be considered secure and were inherited within the family. Redistribution of land rights had stopped and was not considered to threaten the land security at the time we carried out the survey. The farmers were concerned with the falling productivity of their land due to soil erosion but conservation technologies were not adopted on erodible lands.

The survey was carried out in 1994. The households were stratified according to their number of oxen, a vital asset used for cultivation. Random samples were taken from each stratum (0, 1, 2 and >2 oxen). The total sample size was 120 households, 30 from each group.

Estimation

Regression models for each of the three country case studies were developed to identify whether wealth indicators and other household variables were correlated

with or influencing the personal RTPs. In all models the present value equivalent (PV) was chosen as the dependent variable because many households in our case study areas were living close to their minimum subsistence level, which may drive RTPs to infinity. In Table 3.2 we give an overview of the right hand side variables used in the models for each of the three country case study areas. As many asset variables were included, serious multicollinearity became a problem, necessitating careful elimination of some variables.

In Zambia we used two interviewers. We included a dummy variable for the interviewers to check for interviewer bias.

Variables		**Hyp.* sign**	**Indonesia**	**Zambia**	**Ethiopia**
Household characteristics	Age	?	41.0 (1.97)	47.7 (1.6)	46.6 (1.50)
	Sex	?	D**	D	D
	Education	+	3.85 (0.80)	4.75 (0.32)	1.20 (0.18)
	Ethnic group	?	n.r.***	n.r.	D
	Risk aversion	?	n.d.a.****	2.29 (0.14)	n.d.a.
	Household size	+	4.57 (0.29)	4.75 (0.31)	5.25 (0.24)
	C/W-ratio	-	1.36 (0.049)	1.42 (0.042)	1.52 (0.037)
	Children	+	2.03 (0.24)	2.50 (0.20)	2.47 (0.16)
Wealth/ Scarcity variables	Total income	+	927 (165)	70.3 (5.6)	6489 (446)
	Low income	?	D	D	D
	Cash liquidity	+	-27.3 (113.5)	6.86 (1.77)	402 (192)
	Savings	+	13.3 (9.05)	n.d.a.	n.d.a.
	Labour force	+	2.82 (0.175)	2.9 (0.18)	2.8 (0.135)

	Male lab. force	+	n.r.	1.48 (0.13)	1.62 (0.095)
	Female lab. force	+	n.r.	1.54 (0.092)	1.18 (0.068)
	Former land	+	0.518 (0.092)	n.r.	n.r.
	Oxpower	+	n.r.	n.r.	2.23 (0.105)
Other variables	Location*****	?	D	D	n.r.
	Interviewer	?	n.r.	D	n.r.
Observations			35	100	120

Table 3.2: Variables included in the regression models for the three countries

* *Hypthesised sign of variable with respect to PV*

** *D = dummy variable*

*** *n.r. = not relevant for this case study*

**** *n.d.a. = no data available*

***** *Location dummy: 1=good market access, poor soil, land scarcity (Zambia), 0=poor market access, better soil, abundant land (Zambia).*

Household Characteristics

In all of the models, we included certain variables concerning household characteristics: inter alia age, sex, years of education, household size, number of children, and/or consumer-worker ratio. Intuitively, we would expect older people to have higher RTPs than younger people, because they have lower probability of surviving (Eckstein 1961; Kula 1984). From a life cycle perspective, older people are likely to be less interested in investing and therefore demand less credit. This may imply a less severe credit constraint which may in turn suggest lower RTPs. Older people may also have better access to credit because of better established reputations. The net effect of age is thus ambiguous.

Educated people may be more forward-looking (lower RTPs) than the illiterate. On the other hand, if they have access to better investment opportunities they will have higher RTPs. They may also have lower RTP due to more wealth, but we control for this effect through a separate variable on wealth.

We had no a priori expectation of how gender differences could influence the RTP. In Ethiopia, we also included ethnic group as a household characteristic

variable, without expecting this variable to have a certain sign. In the Zambian models, we included independent estimates of risk preferences. For the other countries we did not have available risk preference data. Household heads' risk preferences were estimated using games with real payoffs, similar to what has been done by Binswanger (1981) in his well known study in India. A discrete variable from zero (extreme risk aversion) to five (neutral to negative risk aversion) was defined. With perfect markets, risk preferences should not influence the RTPs because the RTP should equal the market rate of interest (Pender 1996). A significant response of RTPs to risk preferences therefore also indicates an imperfect insurance system. Risk aversion is not sufficient to predict precautionary savings (Kimball 1990), but highly risk averse households (living close to the subsistence level in a risky environment) will keep a buffer stock of savings to insure against income shortfalls (Carroll 1992). More risk-averse people may thus make more precautionary savings but this should be controlled for through the wealth and income variables in our analysis. One can postulate that risk averse households will have a higher RTP if they expect a positive growth rate (g), while a negative growth rate indicates lower RTP (see Munasinghe 1993). In addition, if risk aversion is correlated or confounded with expectations about the future, e.g. such that more risk averse people have more pessimistic expectations about the future outcomes (lower g), more risk averse people will have lower RTPs independent of the current wealth and income level. On the other hand, if investments providing benefits in the far future tend to be more uncertain than investments providing short-term benefits, risk aversion may lead to high RTPs.

Economies of Scale in Consumption, Poverty and RTP

We hypothesised that there were economies of scale in consumption in the household, and that there exists an optimal household size. Below a certain size there are economies of scale due to indivisibilities, but at a certain level this may turn into diseconomies of scale because of organisational problems. A doubling of the household size may require less than a doubling of wealth, liquidity, and other resources to attain the same level of welfare or security. When poverty leads to higher RTP, household economies of scale in consumption implies an inverse relationship between the RTP and household size. Based on the optimal household size theory, there may also be decreasing marginal economies of scale as household size increases, turning to diseconomies of scale at some point. Household size and a squared term of this variable were therefore included. If these variables are significant, and with the signs we have hypothesised, it also indicates a causal link *from* wealth (poverty) to RTP. The reverse causality, that high RTP leads to small household size, seems less likely,

unless high RTP causes households to split more easily. We also wanted to test the hypothesis that households with more children (large households) are more forward-looking and thus have lower RTPs. To test for this we included the number of children, a dummy for whether households had children below 15 years, or the consumer-worker ratio, alternatively.

Wealth Variables

When credit is rationed we expect wealthier individuals to face fewer constraints and lower interest rates in credit markets. Thus, we expect wealthier people to have lower rates of time preference. This is supported by a study from India where the informal credit market was more developed than in our case study areas (Pender 1996). The discount rates Pender found, using experimental questions similar to those in our study, gave RTPs which were significantly higher than the credit market interest rates.

Because asset market imperfections constrain substitution between different categories of wealth, we included several different wealth variables in the models. Some of the asset categories, such as land, were not fully or easily marketable. Under such conditions each asset category may have an independent, direct effect on the RTP. If they have only indirect (and no independent) effects through the income and liquidity variables, this may cause multicollinearity problems, making it necessary to eliminate some variables.

To test whether present wealth is correlated with RTP we included total income (including value of subsistence crops except minor crops), a cash liquidity variable (total income minus total expenditures) and labour force. These variables were calculated per capita in Indonesia and Zambia and per consumer unit in Ethiopia. In Zambia and Ethiopia, male and female labour are not easily interchangeable, and these were included as separate variables. In Indonesia, we used per capita savings in the previous year as a wealth variable. These savings tended to be less liquid as they may have been put in the bank. Data on savings were not available for Zambia and Ethiopia. In Zambia, the inflation rate was high and the real interest rate negative. We believe that a low level of savings and liquidity is a sign of cash shortage (and possibly an effective credit constraint) and would imply a high RTP or low PV (positive sign of coefficient).

Oxen for ploughing are very much a key resource in Ethiopia, and number of oxen was, therefore, included as a wealth variable. Asset variables were expected to have a negative effect on the RTP (positive effect on the PV equivalent). Present access to land was not included in any of the models. Land reforms in Ethiopia and resettlement programs in Sumatra ensured an egalitarian

distribution of land in these two countries. In Indonesia all households had received 2 ha of land with secure tenure rights. There was some difference in the land quality between the two settlements in Indonesia, however. In Zambia, there was abundance of land, and access to land was not considered to be a binding constraint, although land of good quality and with large trees was scarce in the densely populated area.

Past Wealth and Current RTPs

We have argued that the current pure rate of time preference may be inversely related to past wealth. We think this is because poor people are likely to be in more of a survival and current consumption mode. We are able to test for this by controlling for current wealth and income. However, there are alternative theories which could explain a significant relationship between past wealth and current RTPs. People with lower past wealth but with the same current wealth as people with higher past wealth may have lower pure rates of time preference and have been more prone to save and invest (Deaton 1991). Another plausible explanation is that past wealth matters for current investment opportunities. It may imply that people with lower past wealth have higher RTPs because they currently have better investment opportunities.

To test whether former wealth had an independent effect on RTPs, we included a variable called former land ownership (area in Java) in the Indonesian case study. This variable showed how large an area of agricultural land respondents used to own in Java before they were transferred to Sumatra.

Location Dummy Variable: Market Access and Population Pressure

In Indonesia and Zambia, we included a location dummy where 1=good market access/poor land quality (and high population density in Zambia) and 0=poor market access/good land quality (and low population density in Zambia). The sign of the location dummy depends on the relative sizes of the following residual effects.

a) Boserup (1965) effects

Good market access may have a positive effect on household income and thus cause lower RTPs.

Good market access may imply better investment opportunities, higher interest rates and thus higher RTPs.

Good market access may imply better access to credit, lower probability of an efficient credit constraint and thus lower RTPs.

The serious economic decline, high inflation rates negative real interest rates and still low investment levels may make the second argument less relevant in the Zambian case, however.

b) Geertz (1963) (agricultural involution) or Malthusian effect

Population pressure (land asset poverty) leads to poverty and high RTPs.

Land wealth was not included directly. In the poor market access areas soils were better and land more abundant. Land was relatively more abundant in the Zambian area with poor market access than in the Indonesian area with poor market access. This may imply a more significant negative effect on the Location dummy variable in Zambia.

c) Social capital effects

Differences in RTPs may be explained by cultural differences between the areas, the strength of traditions, influence by western culture, religion, and community vigour ("social capital"), which again may depend on political and social stability and security, health standards, etc.

In Zambia, there are cultural differences between the two areas although they are populated by the same ethnic group (Bemba). The densely populated area is more influenced by western culture, traditional norms have lost ground, and this has had a significant negative effect on the level of organisation (social capital) in these villages. Alcoholism, AIDS, and theft of crops represent severe problems in this area (Holden et al. 1994; Holtskog 1996). This social poverty may also drive the RTP up (PV down) and strengthen the likelihood of a negative sign for the location dummy. Intensification according to the theories of Boserup (1965) and Ruthenberg (1980) has taken place as a response to population growth and population concentration in this area (Holden 1991, 1993). The intensification may in this case represent an agricultural involution as the government policy of stimulating food production (maize) for the market has largely failed (Holden et al. 1994; Holden 1996; Wik and Holden 1996; Tviland 1996). The equity pricing system as well as the state sponsored credit and input supply programmes favoured remote areas as transportation costs were covered by the state (Holden 1997).

In Indonesia, the two settlements were inhabited by Javanese transmigrants 5-10 years before our study was carried out, and hence there are no cultural differences. It is possible to test the hypothesis that RTP is a more permanent characteristic of individuals, depending on past wealth, against the hypothesis

that RTP is adjusting to the current liquidity and wealth situation, or is independent of these. If there is no significant difference between the two settlement areas in terms of average RTP, we cannot reject the permanence hypothesis. On the other hand, if a significant difference can be found between the two settlements, and this difference can be explained by variables illustrating the differences between the two areas, we can reject the permanence hypothesis. Furthermore, we test whether RTP is a function of wealth in the past or is independent of the wealth in the past (5-10 years earlier). A significant test result indicates that RTP has at least some degree of permanence related to past wealth levels.

To summarise, the Boserup effects are likely to be stronger in Indonesia than in Zambia because the Indonesian economy shows strong economic growth while economic decline and social disintegration may point more in the direction of a Malthusian scenario in Zambia. If RTP responds to economic conditions, the location dummy may be significant but not necessarily so. We think the location dummy is more likely to be significant with a negative sign (Malthusian scenario) in Zambia due to the economic decline there.

Results

Indonesia

Table 3.1 shows that the surveyed households on average were very poor with an annual income per capita of only US$ 107. Table 3.3 shows that the estimated RTPs were very high and higher in the remote settlement with more severe poverty problems. The difference between the areas was highly significant (t-value=2.9, p=0.01). The hypothesis that RTP is a stable preference parameter unaffected by local conditions may be rejected.

Results from two regression models are presented in Table 3.4. Variables with t-values below one have been excluded. Total income per capita was included in the first model, however, and was not significant. We expected some multicollinearity between this variable and the net cash liquidity variable. This was proved when we removed the total income variable in the second model. The cash liquidity variable then changed from being insignificant in the first model to being significant at 5% level in the second model. The R^2 was 0.57 in both models. The current liquidity situation seemed to be more important than the total income in explaining current RTPs. The labour force was only weakly significant (10% level). The location dummy was also significant with a negative sign indicating a higher rate of time preference in the area with good market access. This result is the opposite of what we see in Table 3.3. This may

be explained by the differences in the savings and cash-liquidity situation of households in the two areas as these were the only significant variables with a systematic difference between the two settlements.[6] It may therefore be concluded that the RTP is influenced by the current income/liquidity situation of households. The household size variable was highly significant and non-linear (1% level). RTP was inversely related to household size, which we think may indicate economies of scale in consumption at small household size but demonising marginal economies of scale as household size increases, and diseconomies of scale for large household sizes. This systematic correlation was not explained by the number of children or consumer-worker ratio effects on the RTP. Reverse causality (high RTP leads to small family size) seems to be unlikely here. We think the result supports our hypothesis concerning a causal link from the current liquidity situation to the RTP. A small cash-constrained household may perceive its cash constraint as more severe than a household of double size and double amount of cash available. The past wealth variable (area in Java) was also significant (5% level), indicating that the more wealth in the past, the lower the RTP today. Thus, RTP is not totally determined by the current income situation but also by past wealth. This is another clear indication of a causal link from wealth to RTPs.

Country/ Area/ Household group	**FV**	**Present Value Equivalent**	**Standard Error of Mean, Rp.**	**Rate of Time Preference, (%)**
Indonesia	Rupiah	Rupiah		
All (n=36)	100,000	39,583	5,536	0.93
Poor market access (n=18)	100,000	26,667	5,224	1.32
Rel. Good market access (n=18)	100,000	52,500	8,904	0.64
Zambia				
All households (n=86)	Maize, 15 bags	5.33	0.57	1.04
	K** 10,000	3,504	361	1.05
	K 100,000	31,269	3,659	1.16
Poor market access/ Low pop. Density (n=38)	Maize, 15 bags	7.24	0.85	0.73
	K 10,000	4,455	575	0.81
	K 100,000	41,763	5,825	0.87
Good market access/ High pop. Density (n=48)	Maize, 15 bags	3.82	0.7	1.37
	K 10,000	2,752	435	1.29
	K 100,000	22,961	4,348	1.47
Ethiopia	Birr	Birr		
All households n=120	100	58.6	1.89	0.53
No oxen (n=30)	100	45.5	3.49	0.79
One ox (n=30)	100	54.3	2.95	0.61
Two oxen (n=30)	100	59.2	3.34	0.52
>Two oxen (n=30)	100	75.5	3.35	0.28

Table 3.3: Average present value equivalents, standard deviations and equivalent rates of time preference in the three country case studies

** More observations had to be deleted in the low population density area in Zambia. Illiteracy and inumeracy were more prevalent problems there.*

*** K= Zambian Kwacha*

Variables	**Indonesia**	**Zambia**	**Ethiopia**
Constant	-45699	-4619**	12.97**
Ethnic group	n.a.	n.a.	7.38*
Sex	n.a.	1206	n.a.
Male Work Force per Capita	n.a.	3529**	n.s.
Total Labour Force per Capita	40209*	n.r.	n.s.
Total Income per Capita	n.s.	0.41E-02	0.0046***
Low income, Dummy var.	n.s.	-1483*	-6.58**
Net Cash Liquidity per Capita	0.058**	0.040**	-0.0047
Oxen	n.a.	n.a.	36.78***
Oxen-squared	n.a.	n.a.	-9.99**
Risk Choice	n.a.	-0.22*	n.a.
Location	-18401**	-2412***	n.a.
Area in Java	15677**	n.r.	n.r.
Househ. Size	25979***	727***	4.4***
Househ.size squared	-2535***	-29.0*	n.s.
Interviewer	n.a.	945	n.a.
R-squared	0.57	0.29	0.44
R-sq.Adj.	0.46	0.19	0.41
No of observations	35	86	120
Future Value	Rp.100,000	Kw.10,000	Birr 100

Table 3.4: Regression analysis: Variables correlated with time preferences of peasant households in Indonesia, Zambia and Ethiopia (Ordinary Least Squares). Dependent variables: Present value equivalents of given future value

*Note: Parameter values given with significance levels: *: 10%, **: 5%, ***: 1%. Variables with t-values below 1 in all three models were removed. n.a.=not applicable or not available, n.s. =not significant (t-value<1), n.r.= not relevant*

Zambia

The average total income per capita among the sampled households was US$ 108 per annum, indicating their relatively severe level of poverty (Table 3.1). In Table 3.3 we see that average RTPs were above 100% for all three hypothetical questions.

Regression analyses were run for each of the three hypothetical questions. The results are presented in Table 3.4. The R^2s were fairly low, ranging from 0.22 to 0.29 for the three models. Most of the Household Characteristics variables had t-values below one and have been removed in the models presented. The Sex of Household head variable had a t-value above one in one of the models and was thus retained. Its sign was not consistent in the three models. The Male Work Force variable had t-values above one and a significant positive parameter value in one model. The sign was as expected (Table 3.2). The Total Income Per Capita variable was insignificant in all three models. It was retained because it was combined with a dummy variable for the third of the households with the lowest income, which became weakly significant. There is thus only a weak indication of a non-linear relationship between the PV and the income level. The wealth variables, Total Income and Labour Force Per Capita, had no significant effect on or correlation with the RTP. The Cash Liquidity variable was, however, significant with the expected sign, in all three models. Cash scarcity (liquidity constraints) thus seemed to drive up the RTPs. The reverse could also be true.

The Risk Preference variable was significant in two models, and highly significant (1% level) in the model with maize. The signs indicate that more risk- averse households have higher PV (lower RTPs). This either supports the hypotheses that risk-averse households worry more about the future (are more pessimistic and have lower expectations about consumption/ income growth), and thus have lower RTPs, or they have higher elasticities of marginal utility of consumption with negative expected consumption growth.

The Location dummy variable was highly significant in all three models. The signs were consistent with our a priori expectation. The rates of time preference were lower in the low population density area. The villages in the area with high population pressure and good market access have high RTPs. This is in line with our hypothesis that the Boserup effects (population pressure leading to economic development, wealth accumulation, and thus lower RTPs) are weak in this stagnant or declining economy where problems such as loss of traditional norms, social disintegration, high unemployment, low investment levels, weakened social services, and AIDS are signs of regressive development.

The Household Size and Household Size Squared variables were significant in only one model, but the signs were consistent and all t-values were above one, indicating an inverse relationship between household size and RTP, which supports the economies of scale in consumption hypothesis and the causal link from wealth to RTP. The Consumer-Worker variable was insignificant. The Interviewer dummy variable was significant in one of the models - the model with the highest monetary values. This was also the model with the lowest R^2 and the model with the highest average RTP. This indicates that one should interpret the results with caution.

Ethiopia

The average level of income per capita was higher (US$196) for this sample than for the samples in Indonesia and Zambia (Table 3.1). This may be surprising, as overall GDP per capita is considerably lower in Ethiopia than in the two other countries. The relatively high level of total income in Ethiopia is because the survey was conducted in one of the best grain producing areas in the country. From Table 3.3 we see that the average rates of time preferences were considerably lower than in Indonesia and Zambia. Futhermore, there were significant differences between the strata. The group without oxen (the poorest) had significantly a higher average RTP than the groups with one or more oxen. Moreover, the group with more than two oxen had a significantly lower average RTP than the groups with one or two oxen.

Results from the regression analysis are presented in Table 3.4. The R^2 was 0.44. None of the Household Characteristics variables were significant, except for the Ethnic Group variable which was significant at the 10% level. This variable was a dummy variable with *Oromo* equal to zero and *Amhara* and others equal to one. The positive sign indicated that the second group had a lower RTP than the first group. Oxen Wealth had a significant non-linear effect on the stated PVs. As hypothesised, the RTP was declining with increasing number of oxen. The Total Income Per Consumer Unit was highly significant (1% level). Likewise, when we combined Total Income Per Capita with a dummy variable (=1) for the third of the households with Lowest Income Per Capita, we found this variable to be significant (5% level). There was thus an inverse relationship between Income Per Capita and RTP. The negative sign of the Low Income Dummy variable indicates that the PV is significantly lower for the low income households and this comes in addition to the effect of the Total Income variable. We also found a significant inverse relationship between Household Size and RTP, indicating economies of scale in consumption and a causal link from wealth to RTP. Large households had a lower RTP than small

households with the same level of wealth per consumer unit. The Consumer-Worker Ratio or Number of Children in the Household variables were insignificant. We can thus reject the competing hypothesis that the inverse relation between household size and RTP is because households with children are more forward-looking and therefore have lower RTPs.

Cash scarcity was not significantly influencial upon (or correlated with) the stated RTPs, contrary to what we found in Indonesia and Zambia. This may be due to the relatively higher level of income and food security in the Ethiopian case. If we had carried out the survey after a drought or another calamity, the responses may have been different. The results support the hypotheses that poorer households on average have higher rates of time preference than wealthier households and that poverty may lead to higher RTPs.

Conclusions

The estimated RTPs were very high in all three countries. The rates were higher in the case studies in Indonesia and Zambia where the average levels of income were lower than in Ethiopia. Rates varied systematically in each case study area. Poorer households, and/or households with severe immediate cash needs, had higher RTPs. In Indonesia and Zambia, immediate cash needs and consumption- smoothing problems were correlated with high RTPs, while a similar correlation was not found in Ethiopia. Total income and animal wealth seemed to play a more important role than immediate cash needs in explaining the RTPs in Ethiopia, where households in the sample were relatively better off than in the other two countries.

The direction of causality was tested in Indonesia. Both past wealth (land ownership) and current cash scarcity were found to affect current RTPs. In all case study areas the Household size variable was found to be inversely correlated with the RTPs. We interpret this to be due to economies of scale in consumption combined with a causal effect between wealth/cash scarcity and RTP. The hypothesis that large households (with more children) have lower RTPs because they care for their children was rejected. The causal link between poverty and RTP has important policy implications, as it follows that poverty reduction may contribute to lower RTPs and thus reduce the "intertemporal externality" and increase the probability of and/or size of investments. Lower rates of time preference make investments that offer long- term benefits with short term-costs (typical for e.g. soil conservation, tree planting, etc.) more

profitable. This finding may give credence to policies for poverty reduction, both in terms of efficiency and sustainability.

In the Zambian case study, we included an independent estimation of risk preferences. High risk aversion was found to be correlated with lower RTPs, indicating imperfect opportunities to hedge against future risk. Our results support the hypothesis that more risk averse households have lower RTPs either due to more pessimistic expectations about income growth (negative growth), and/or they have higher elasticities of marginal utility of income which pulls in the same direction when growth rates are negative. In the Zambian case it appeared that RTPs were higher in the densely populated area with good market access. This may be a sign of disintegration of agricultural and social systems with increasing population pressure. In the Indonesian case, RTPs were lower in the settlement with good market access. However, the location dummy in the regression analysis had the same sign as in the Zambian case (i.e., the area with better market access had higher RTP). This might be due to the higher land quality (wealth) in the settlement with poor market access, perhaps indicating that market access alone may not be sufficient to reverse Malthusian effects through Boserup effects.

Our findings indicate that poverty and cash constraints or scarcity may have important consequences for behaviour. They may lead to high rates of time preference which may affect investments in environmental conservation. Due to pervasive market imperfections, introduction of private property rights may not be a sufficient policy instrument to achieve sustainable management of natural resources in poor rural economies. Additional policy interventions are required to alleviate poverty and enhance sustainable management of natural resources.

Our results may also indicate that personal RTPs can be indicators of the level of poverty and immediate subsistence consumption constraints of people living in rural areas in developing countries where credit and other markets are poorly developed. Further research should be conducted to test this hypothesis.

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Notes

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[2] Corresponding author. The first author claims senior authorship.

[3] A tendency for any contract offered to all individuals to be most attractive to those most likely to benefit from it (i.e. people most likely to default).

[4] The danger that if a contract promises payments on certain conditions, people will change their behaviour so these conditions are more likely to occur (i.e. higher interest rates on credits induce projects with higher risks)

[5] Tviland(1996) found that credit rationing became more serious during the period 1993 to 1995 as the percentage of households which received credit out of those which applied was reduced from 56% in 1993 to 14% in 1995. Approximately 60% of the farmers had applied for credit in both years. The default rate for those which received credit increased from 15% to 35% from 1994 to 1995.

[6] Estimated average savings and cash liquidity (total income-total expenditure) were Rp.66,000 and Rp.380,000 in the settlement with good market vs Rp.20,900 and Rp.-37,000 in the area with poor market access.

Chapter 4

Ecological Degradation and Women in Poverty in India

B. K. Nagla[1]

Introduction

Recent decades have witnessed a growing awareness about the need to prevent environmental damage. The United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992 marked the culmination of two decades of environmentalism, where global concern for sustainable development has moved from issue to issue, from desertification to acid rain, and now to ozone depletion and the greenhouse effect. The official response to environmental problems has largely been one of offering technological and managerial fixes which, rather than addressing or solving the basic ecological problems, often create new ones.

Another response to the growing ecological crisis comes from women engaged in the struggle for survival. Because of their location on the fringes and their role in producing sustenance, women from Third World societies are often able to offer ecological insights that are deeper and richer than the technocratic recipes of international experts or the responses of men in their own societies (Shiva 1993). There are two reasons for this. First, these responses come from cultures in which maintenance of life has been a civilising force. Second, the gender biases in the division of labour, aggravated by the development process, have increasingly pushed women to work for the production of substance.

The problems of gender, poverty and environmental degradation are interlinked and cannot be understood in isolation. The primary responsibility that women have for fuel, fodder and water collection, deforestation, and overall erosion of the natural resource-base has affected them adversely. For example, as many as 80 per cent of Indian women are directly dependent on the forest as managers of the local resource base. Water resources are also becoming scarce because of poor management, wastage and pollution. Policies have favoured the relatively privileged sections of the population and have increased the burden of poverty for a significant section of the underprivileged.

Poor women have a marginal role and are almost invisible in the formal sector. This complicates the analysis of their interplay with the environment. The responsibility of bearing and rearing children is usually considered “secondary” to the role of “male as bread winner”. Moreover, even if poor women are involved in economic activities, most of these activities are related to “family occupations” like agriculture, animal husbandry, forestry, weaving and construction labour. Women’s personal contribution gets merged with the family and become invisible. Although women have the dual role of reproduction and production, their contribution is considered “secondary”, “marginal” and “supplementary”. Often the most invisible victim is the young girl in the family who assists her mother in home work, in collecting fodder, fuel and water in economic activities and in the

care of young children. Now, women are facing complex problems in performing their role due to environmental changes which are threatening their sources for survival.

The article first discusses different approaches to analysing women and environment. This paper takes a developmentalist view of gender analysis to examine the impact of environmental degradation particularly to explore the situation of India women in poverty. In section 3 I analyse how women are affected by environmental degradation and poverty. Environmental degradation will hurt them disproportionally by threatening their source of survival and by increasing the time and energy required to search for the necessities of life. Then section 4 highlights the role of women in environmental movements in India. In section 5, the need for empowering women for sustainable development is emphasised, and this is seen in relation to the threats and opportunities of public policies. It is shown that inappropriate public policies have created many environmental problems, and that these have been particularly harmful to women. The government could reverse this by vesting the responsibility for forest resources to local communities by explicitly setting out the rights of women.

Approaches to Analysing Women and the Environment

The ideology of patriarchy and its use in perpetuating a 'predominantly male inheritance system', a gender-biased division of labour, discrimination in resource allocation and remuneration and in treating women as supplementary earners, has helped to perpetuate male dominance. Women's own acceptance of subordination has often strengthened these institutionalised privileges. Such privileges are embodied in both our cultural heritage and also in state policies which extend gender inequalities in society.[2]

The relation between women and the environment has been subject to extensive literature. The debate has tended to polarise between two approaches – the *Women in Development* (WID) and the *Ecofeminist* school (Joekes 1994). The WID approach to project and planning interventions emphasises the importance of women in their role as environment resource managers, their vulnerability to declines in resource availability and the need to develop environmental programmes directed at assisting women, essentially in parallel to, and separately from, men's programmes (Dankelmann and Davidson 1989).

The Ecofeminist school has a different, ideologically driven factor. It derives from a philosophy of feminism grouped in women's affinity with the forces of nature as

opposed to men's urge to control and manipulate the natural world through application of the scientific method. It similarly advocates respect and support from women's efforts to conserve the environment. It puts greater stress, however, on the active initiatives displayed by women in defence of environment resources in various third world setting (Shiva 1989).

Joekes (1994) suggests that a *Developmentalist* perspective is a corrective to the shortcomings of both the WID and Ecofeminist approaches. While acknowledging that in many situations women do have primary responsibility for use of natural resources in the sense of being the social agents who collect fuelwood, water, wild foods, relishes and medicaments, Joekes notes that these tasks are not so universally ascribed to women as the literature suggests. For example, men often contribute to fuelwood collection and other tasks, even if the modalities by which they do so many differ and reflect other social patterns of disadvantage to women. For example, men tend to have access to animal traction, bicycles or equipment such as saws denied to women. In this perspective, women's and men's relation to environmental resources is seen merely as part of general entitlements and capabilities ascribed to individuals by social relations and gender, class and so on (Agarwal 1992; Leach and Mearns 1991; Rocheleau 1992).

Environment, Poverty and Women in India

In India and other developing countries women's life in turn is intimately linked with land, water and forest resources. For example, women are the predominant workers on agricultural land: they spend 10 to 12 hours daily in working in the field, fetching water and gathering fuel and fodder. Moreover, women also gather a range of forest produce for self-consumption or sell these as raw material for craft and production.

Over 70 per cent of the population derive their livelihood from land in India. Women have traditionally played an important role in land use whether it is for agriculture, pastures for animal husbandry, or land covered with forest. However, access to ownership of land is extremely limited.

Of India's total land mass, 1.75 million km^2 or 53 per cent is estimated to be subject to serious environmental degradation due to rapid deforestation, soil erosion, siltation of reservoirs, water logging and salinity. Due to various reasons, such as the construction of big dams, the flow in the rivers has been reduced. This, as well as the pollution of ground water by numerous industries, has reduced the quality of drinking water and inland fisheries.

Several recent developments in India have resulted in depriving poor women of the supply of their basic needs from the forest. The exploitation of forest for industrial or commercial purposes without an effective programme of forest regeneration is an example of this. Many other developmental activities such as irrigation, communication and mining, also deprive poor women.

Implications of Deforestation on Rural Women

Although deforestation is a critical global phenomenon, its specific implications for women have been neglected. Agarwal (1988) argues that implications for women arise from two types of linkages. The first is the adverse effect of deforestation on agricultural output, particularly in the hills and other vulnerable ecological zones.[3] The second ill effect is related to the forest being a crucial source of fuel, fodder and water. With increasing deforestation and the degradation and declining availability of natural resources, the burden of this falls on women and female children whose time and energy required in gathering firewood water, fodder etc. increases substantially.

Women's primary responsibility for cooking, fetching water, and gathering fuel and fodder presents particular hardship when ecological degradation of forests and common land reduces the availability of essential non-monetised resources.

For the poor, forests and common property pastures are an essential source of fuel, fodder, and food. This source is under constant strain due to retreat of the forest from every pocket in India. It is increasingly recognised that the responsibility for fodder and fuel collection in rural India rests largely with women. India's loss of an estimated 34 per cent of its forest cover between 1974 and 1984 raises deep concerns about the eventual regional and even global impact of this depletion.

In India, as in many other developing countries, deforestation increases disproportionally the hardships of women. For example, in Rajasthan, despite women having to walk as far as 20 kilometres for fuelwood, men do not help women in this task. In Uttar Pradesh, Garhwal women also complained that deforestation is forcing them to walk further and further each year. In parts of Bihar where up to a few years ago women of poor rural households could get wood for self-consumption or sale within a distance of one or two kilometres, they have now to trek 8-10 kilometres daily. In some villages of Gujarat, even a daily search of four to five hours can no longer yield enough, and dependence on tree roots, weeds and shrubs is increasing. However, these materials do not provide adequate heat, thus also increasing women's cooking time. Given the already heavy working day of most rural women, especially in the poorer households, any additional time and energy spent on such chores becomes an overwhelming

burden. Yet, for poor women, the impact of deforestation goes further than the fuel and fodder crisis. In fact, a "domestic bias" in much of the women's relationship to forest resources and management has obscured women's essential role in the non-domestic and commercial forest economy (Kaur 1991). In addition to wage-employment in public sector, forest-based enterprise or special programmes such as social forestry, women are employed in large numbers in the collection, processing, and sale of non timber forest products. For these women, deforestation means loss of jobs and income.

Deforestation also affects the availability of forest products other than firewood such as fruit, fodder and pods which provide oils, liquor and cattle feed. By one estimate, 30 million people in India (mostly tribal and forest dwellers) depend upon such minor products for some part of their livelihood, and it is they who are getting marginalised (Kulkarni 1982). For example, Agarwal and Deshingkar (1983) estimated that in India 2-3 million rural people (mostly women) depend on the sale of wood to urban areas for their livelihood.

Deforestation reduces ground water recharge, contributing to failing water tables and drying streams, thus compounding the difficulty women face in getting drinking water, especially in dry seasons. Drinking water crises in dry and drought-prone areas or hill areas have the worst impact on women's economic and personal lives. Walking 3-4 kilometres to fetch water is a common ordeal for them in such areas.

Health Effects of Poor Environment on Women

Poor health arise from two conditions: *deprivation of essentials* or an *excess of non-essentials* (Shiva 1993). Ecological erosion leads to deprivation of essentials, such as food, clean and adequate water, air, health care, and safe living and working conditions. Pollution leads to the excess of non-essentials consisting of bombarding our beings, our lives and our environment with hazardous gases, chemicals and biological contamination. No amount of drugs and doctors can create health, if essentials are becoming more scarce and non-essentials more pervasive.

Malnutrition and health hazards are the key consequences of degraded and contaminated resources. While the adverse nutritional effects impinge on the whole household, women bear an additional burden because of the noted biases in the distribution of food within the family to the (male) head of the household . Moreover, women are unlikely to get the extra food necessary to make up for the additional energy expanded on fuel collection.

Being responsible for household provisioning and child rearing puts women in the front line. Women and their children are thus the ones most exposed to and affected by hazards caused by impurity of water and contamination of food.

Environmental Degradation and Poverty as Reasons for Migration

The primary incentive to migration comes from the insufficiency or poor quality of resources available to the household. Negative ecological consequences flow from the breakdown or weakening of the system of cultivation and from the excess work burden placed on women. Increasing pauperisation in rural areas has led to streams of migration and polarisation between rural and urban areas, with considerable concentration of wealth and the social services in the urban economy. In addition, displacement by irrigation and industrial projects have increased rural out-migration.

Migration has affected women on two fronts. First, if men migrate, women have to take the total responsibility for the family left behind. If the whole family migrates, women themselves need to play the dual role of earner and home-maker while living and working in conditions which often lack even the basic sanitary facilities. Moreover, in urban areas women may have no choice but to seek marginal employment with frightful working conditions.

Migration occurs due to a combination of state policies and forces of modernisation which have brought the forest people and their areas in India to the brink of social and ecological extinction. Appropriation of forests by the state and their exploitation by domestic and foreign logging companies have resulted in the displacement and expulsion of the indigenous people. The reduction in available resources, together with insecurity in land and forest tenure, have contributed to both the impoverishment of people and the degradation of resources.

Role of Women in Environmental Movements in India

Conflicts over forests, water and other natural resources have been wide-spread across human history. In pre-modern times they arose typically as a consequences of competing property claims and economic interests (Gadgil and Guha 1992). In the modern world, however, these conflicts have increasingly acquired a sharp ecological edge, being played out against the backdrop of increasing resource scarcities and shortages.

The mid-1970s and 80s witnessed several environmental conflicts in Asia, Africa and Latin America. The period was also marked by the emergence in the developing countries of women's voices and their perspectives. The decisive role played by women in protecting and preserving the environment can be highlighted by citing examples spread all over the globe.[4]

In India, although nature-based conflict was by no means unknown in the past, the proximate cause of the struggles analysed here has been the pattern of development that followed since independence in 1947. The distortions in resource flows, preferential subsidies and short term horizons of capitalists and the state have all worked to sharply circumscribe the access of the poor to the gifts of nature (Gadgil and Guha 1994). The ensuing conflicts have been generated both by ongoing processes, such as the history of forest management, and massive new projects, such as large dams. The variety of nature-based conflicts notwithstanding, two particular movements stand out for their symbolic importance to the Indian environment debate: the "*Chipko*" and the "*Narmada*" movements.

The most famous movement to thwart deforestation has been the tree hugging Chipko movement which has now passed into history. The movement developed in the context of a very long history of popular mobilisation against government control of forests in the Kingdom of Tehri-Garhwal dating to the turn of the century (Bandyopadhyay and Shiva 1987). The movement to assert popular rights to forests intensified during the Gandhian nationalist struggles of the 1920s (Tucker 1988). After independence, the Chipko movement initiated by environmentalist Sunderlal Bahuguna witnessed the emergence of women as the strongest spoke persons for a sustainable model of forest, water and energy development. The women argued that if the forest is destroyed their main source of fuel, fodder and water would also be destroyed. They focused both on tree protection and reforestation. Therefore, Chipko developed on this basis and evolved into a movement of non-violent resistance to logging, in which the mobilisation of women, notably tribal Bhotiyas of the village of Reni in Chamoli District, played a leading role. Finally, logging was reduced and curtailed. The movement has subsequently spread and diversified into many other parts of India (Hegde 1988).

Baba Amte launched the Narmada movement in which women are participating enthusiastically in the ongoing struggles against the Narmada Valley Project, whose eventual outcome is still uncertain. The first movement was dedicated to the "women of Chamoli" who were amongst the originators of the Chipko movement, and the second was dedicated simply to the "dam displaced people of India" as indicated in the dedications of the first two citizens' reports on the state of Indian Environment (GSE 1982 and 1985). Both movements are invested with a deeper

cultural, almost religious significance. Chipko originated in the watershed of the holiest river of Hinduism, while for the people of central India the Narmada is no less sacred than the Ganga.

The two movements have helped to generate a far-reaching debate on the direction of economic development in India, and on the kind of society and ecology most appropriate to the needs of its culturally diverse society (Gadgil and Guha 1994). The Chipko and Narmada movements have inspired the growth of other movements in India. For example, in a drought-prone area in Bankura district, West Bengal, women organised themselves to reclaim wasteland. A member of Grameen Mahila Shramik Unnayam Samiti (Village Women's Labour Elevating Association) told the forest officials:

> *"For you trees are deadwood, for us they are living things. They are like our limbs, each time one is cut, our chances of survival are cut."*

Empowerment and Public Policies

The Need for Empowering Women for Sustainable Development

In a rural context, sustainable development involves not only conserving biological diversity, fauna and flora, but also maintaining ecological functions such as soil quality, hydrological cycles, climate and weather, river flow and water quality. Sustainable development also implies maintaining supplies of natural products – such as gum, fish, fodder, fruits, nuts, resins, dyes, basts, construction materials, fuelwood – which are essential to the livelihood of local people.

Women make up a substantial number of the world's food producers, and in general, take the main role in procuring, managing, and utilising water and fuel resources. Thus, women sustain close interactions with nature in performing their multiple roles, with lasting environmental implications. In order to play their various roles in preserving an ecological balance, their hands need to be strengthened by empowering them urgently.

Although about half of women in developing countries cannot read and write, they are not bereft of knowledge, acquired through their experience and informal way of learning. Their contribution and the roles which they can play for sustainable development can neither be ignored nor be underestimated despite their rates of illiteracy, which are higher than those of men. Women's contributions can further be enhanced if the male-dominated society is willing to accept their rightful role,

which constitutes the empowerment of women. From the perspective of the environment, the rights of women are of special importance. Empowerment of women is essential to achieve sustainable development (Lucy 1995).

Public Policies Threatening Women and the Environment

Existing evidence reflects the past and ongoing government policies and schemes as significant causes of deforestation and environmental degradation. Historically, under British rule, vast tracts of forest in the Garhwal and Kumaon hills and elsewhere were cleared to supply wood to railways and to ship-building through Indian and European contractors. Often no supervision had been exercised on the contractors, leading to enormous wastage. Large areas of forest land were also given to individuals for land revenue gains (Guha 1983). The cutting of forests for commercial use has continued in the post-colonial period to provide building logs, industrial raw materials, especially for paper manufacturing, fuel to small scale and cottage industries, etc. Forest land has also been lost due to mining, stone quarrying, agriculture, and river valley projects.

For both agriculture and natural resource use, Indian public policies have favoured the relatively privileged sections of the population and increased the burden of poverty for significant sections of the underprivileged. Given existing intra-household gender inequalities with regard to the division of labour and in matters of access to food, health care, cash income, and productive resources, women of such households have typically been left worse off than men. As women have the primary responsibility for fuel, fodder and water collection, deforestation and overall erosion of the natural resource base has affected them adversely in an immediate way.

In India, public policies have contributed significantly to the rapid depletion of the country's land, water and forest resources, and the increasing appropriation of what remains by a few. Agarwal (1988) lists the following environmental problems that are resulting from inappropriate government policies:

i) The permanent fall in the ground water table in many areas due to unmonitored private tubewell expansion, with the consequent drying up of shallower irrigation and drinking water wells;

ii) Escalating deforestation due especially to commercial tree felling, large scale surface irrigation works, and agricultural expansion;

iii) Soil erosion due to loss of tree cover, canal-related water logging, salinity, etc.;

iv)The decline in the "village commons" due to appropriation by large farmers and government auctioning to private contractors; and

v) Barring the poor to access forest produce.

These policies have all created severe shortages in the availability of fuel, fodder, water and gathered food items to poor women. Moreover, the policies have made questionable the long-term sustainability of agricultural yields under the present agricultural strategy, as ecological degradation associated with specific forms of agricultural and irrigational development.

Furthermore, women have not received enough attention by policymakers in agricultural policies and programmes. They continue to be treated mainly as subordinate helpers or labourers. Women workers have not received adequate protection from the Minimum Wages Acts as well as from the Equal Remuneration Act.

Public Policies to Improve the Environment and Plight of Women

Broadly speaking, policies that could benefit the poor and vest responsibility for forest resources in local communities would benefit women. However, when new forest assets are created, women's rights to them must be explicitly set out and enforced. Indian state and local government authorities would find the involvement of non-governmental organisations (NGO) very useful here.

Certain government policies and features of the production and marketing arrangements for forest products also have reduced women's employment and income (Bennett 1992). Therefore, public policies could favour better marketing of non-timber forest products (NTFPs) from primary collectors to final users, which would also benefit women. This recommendation is manifested by Commander (1986) who estimated that NTFPs account almost 40 per cent of the total revenues of the Forest Departments of India and 75 per cent of net export earnings from forest produce. However, no national policy governs this important area. Even the social forestry programmes have not brought NTFP within their purview. They concentrate instead on traditional components of forestry handled by Forest Departments.

Women's reliance on multiple forest products must be taken into account. If adequate substitutes for lost fuel, fodder and other forest resources are not available, the remaining resources must not be depleted through cash crop plantations on commons especially if, as in the past, these are controlled by men. While women labourers have formed the majority of nursery workers, in only a few cases have women been targeted for the establishment of private nurseries.

Many specific measures could be taken to improve the design and workings of social forestry projects. The essential thrust of all of them is: involve the women. Women have an essential role to play in plantation in planning for them, choosing species, and in actually doing the planting and protecting. For instance, women have invariably responded positively to Integrated Rural Development programmes, which help them obtain plant fuelwood, fodder, fruit bamboo (the tree *Bassia Latifolia*) and *mahua* trees, or making in *chullahas.*

Concluding Remarks

Environmental problems should be gender-sensitive and gender-perceived. This is because any deterioration in the environment culminates in heavier loads on women in the performance of their multiple domestic roles such as managers of household chores, educators of children and protectors of family health (Dayal 1993).

Women's lives intersect with the changing environment in the context of poverty and lack or loss of their traditional rights of forests. Traditional knowledge and systems of land use have proved far more environmentally appropriate, resilient and complex than initially supposed by outsiders. Forest people have successfully opposed many socially and environmentally destructive development schemes proposed for their lands. Thus, traditional systems of resource use are generally more "sustainable" and need not be dismissed as "backward" and "wasteful" (Colchester 1993).

Empowerment of women is germane to achieve sustainable development. This is a worthy cause alone. However, by empowering women, a double benefit can be gained: reduced poverty and an improved environment.

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Notes

[1] I thank Matti Vainio and Arild Angelsen for several suggestions which have improved the paper.

[2] Gender inequalities exist in all section of society. The division of labour is highly gender biased favouring men against women. The discrimination is manifested in the works of males and females and their earnings. Gender inequality is also marked in discriminatory food allocation and acquisition of educational and vocational skills. In spite of the impressive increase in total numbers of literate women, the male-female gaps remain large. The present situation of illiteracy amongst women, which is negatively related to fertility rates and infant child mortality rates, further perpetuate gender inequalities (Sharamashakti 1988).

3 Appropriate tree-cover protects the sub-soil and prevents soil erosion; trees act as a sponge for absorbing rain water and so replenish ground water sources for irrigation, and when planted along field boundaries, serves as a wind break and protect the crops. The disappearance of forests produces a tendency for rain water to be released in flood during the wet regions followed by drought in other seasons (Myres 1978). These and other ill effects adversely affect agricultural productivity, especially in the hills, where women are frequently the primary cultivators.

[4] A movement was launched in Serawak, Malaysia in 1987 against those involved in degrading the ecology and environment. The lives of the Penan community that have inhabited and lived on the tropical rain forests were threatened by the extraction of logs to Japan. The Penan women rose to form human barricades across the logging roads to frustrate the greed of timber tycoons to plunder the green gold of their country. They looked to land for their very survival and for something they must bequeath to their children.

Chapter 5

Poverty and the Environment: Some Observations from Malaysia

Nuraain Amirah @ Winnie Yee and *Mohd. Yaakub Hj. Johari*[1]

Introduction

The poverty and the environment issue has come to the fore of the development agenda in the early 1990s mainly as an extension of the sustainable development debate which was one of the most important parts of the United Nations Conference on Environment and Development (UNCED) at Rio in 1992. Much of the discussion at UNCED was focused on macro-global concerns, and one of the more controversial debates was on how poor or developing countries were destroying their environmental base in pursuit of economic development. This macro perspective has been adopted by many in the development circles in linking poverty and the environment at the local or micro levels. Poor people are said to have short term horizons. By extension, it is said that poor people are forced to take short term gains in overexploiting their environment in order to meet their everyday needs.

Our understanding of the two-way linkages between poverty and the environment is limited, and the assumption that these variables invariably reinforce each other negatively needs to be questioned as observations at the micro level do not necessarily indicate this to be true all the time (Blaikie and Brookfield 1987; Tiffen 1993; Green 1994).

Malaysia has responded to the development and environment debate by pointing at our good track record in both our ability to achieve economic growth and poverty eradication while ensuring that our environment is well safe-guarded (Sham Sani 1993). The official statistics on poverty reduction, economic growth, and the state of the environment seems to support this claim (6th Malaysia Plan 1991-1995).

Since the late 70's, except for the years 1985 to 1987 when global economic conditions were adverse, Malaysia has consistently achieved annual economic growth rates of six to eight per cent. At the same time, the incidence of poverty in Peninsular Malaysia has declined from 49.3 per cent in 1970 to about 15 per cent in 1989. Over the same period, the incidence of poverty in Sabah and Sarawak has also declined from 58.3 per cent to 34.3 per cent and from 56.5 per cent to 21.0 respectively. In addition, as noted by Ishak Shari (1994), the reduction in absolute poverty was accompanied by a reduction in income inequalities in general and a narrowing of the urban-rural income disparities.

From the data above, it is easy to conclude that the decline in poverty in Malaysia is due to the country's economic growth. Although this is true to some extent, the impact of government spending on rural development programmes in general and on poverty eradication in particular cannot be ignored. Since the Second Malaysia Plan (1971-1975), Malaysia has made the eradication of poverty one of its main development goals. The central strategy used to achieve

this was rural development, since poverty was much higher in the rural areas. Besides the special focus on rural development, Malaysia has also allocated significant resources into health, social and education programmes.

The rural development package implemented by various governmental agencies included new land development programmes, *in-situ* development through various integrated agricultural development programmes, replanting, rehabilitation and the provision of infrastructure, drainage and irrigation, as well as support services such as credit, marketing, research, extension and incentives for the commercialisation of agriculture. These programmes were targeted at poverty groups such as subsistence farmers, shifting cultivators, the Orang Asli or indigenous people of Peninsular Malaysia, and artisanal fishing communities.

In terms of expenditure, the allocation for poverty eradication programmes had ranged from about 32 per cent to about 24 per cent of the total Federal Government development budget throughout the various five-year plans. It can therefore be said that poverty reduction in Malaysia to a large extent has been achieved through government spending and subsidies. There are, however, also indications that the impact of these programmes is limited and may also be unsustainable (Ishak Shari 1994). Our efforts in poverty eradication need to look at other factors, particularly those operative at the local or micro level, which contribute to the impoverishment of certain vulnerable communities.

The objective of this paper is to explore the relationship between poverty and the environment in the context of four groups of communities which have been identified to be poor in almost all of our five-year development plans. (i) Does environmental degradation contribute to the target group's poverty and vice versa? (ii) What are the factors or variables that shape this relationship? (iii) Are the poor victims or agents of environmental degradation, or both?

The outline of the chapter is as follows. Section 2 contains a very brief review of the poverty-environment links. Section 3 gives a more detailed discussion of the four groups focussed on, namely urban squatters, artisanal fisherfolk, shifting cultivators, and the *Orang Asli* or indigenous people of Peninsular Malaysia. Section 4 discusses and summarizes the results of the four case studies, and highlights some important points and aspects that are currently lacking in studies and approaches to policy and programme designed to address poverty and the environment concerns.

Understanding the Links between Poverty and the Environment

A disturbing feature of the current debate on poverty and the environment stems from the common practice by decision makers and planners to draw conclusions from narrow observations of a limited number of factors in an otherwise

complex issue. A common example concerns how the shifting cultivators, i.e. the poor, are degrading the environment through their 'slash and burn' practices. These communities are often blamed for almost all the environmental degradation relating to tropical forests and land. Often ignored are the questions related to why these communities continue to farm using thesis methods, why a once environmentally friendly and productive farming system has become such an 'evil', and what the extent of environmental degradation caused by this farming system vis-a-vis other development activities actually is. The unsuccessful performance of programmes to eradicate shifting cultivation is partly due to these narrow assumptions which contribute to the design of inappropriate programmes for these communities.

In order to understand more fully the interactions between poverty and the environment, the analysis has to take into consideration processes which operate at both the macro and micro levels. According to Leach and Mearns (1991), the process of interaction between people and the environment is moderated by 'environmental entitlements' or 'the combined outcome of both (a) the environmental resource bundles that people have command over as a result of their ownership, their own production, or their membership of a particular social or economic group; and (b) their ability to make effective use of those resource bundles'. At the micro level a variety of factors such as technology, available capital, natural resource tenure arrangements, and gender and other social relations will influence environmental entitlements, whilst at the macro level environmental processes and a series of other exogenous social, economic and political processes will structure the processes operative at the micro level (Green 1994).

The utilisation of this framework for the analysis in this paper is limited by the availability of appropriate data. As a result, the format of discussion for each of the case studies differ from one another depending on the kinds of information available.

Case Studies

Urban Squatters

Almost half the country's total population of about 18 million is living in the urban areas (Malaysia Yearbook of Statistics 1992) and the pace of future urbanisation is expected to accelerate (ADB 1986). Although it has one of the highest rates of urban growth among the 13 states, Sabah's level of urbanisation

at 0.33 is still relatively low. With rapid urbanisation, the percentage of urban poor in relation to the total poor in the country has been increasing steadily (Mohd. Yusof Kassim 1991). Urban squatters make up a significant proportion of the urban poor. For example, an IDS study of 18 squatter settlements in the Kota Kinabalu-Penampang conurbation found that about 75 per cent of the household incomes fell below the poverty line income of RM533 or US$221 per month for a household of five measured in 1985 PPP (IDS 1992).

It is generally accepted that the most visible indicator of poverty in the city is the poor quality of people's homes and environment. Most of the available literature on urban squatters tend to portray them as agents of environmental degradation (see for example DBKL 1981; Tsen N.V. 1991). Urban squatters often pollute the urban environment, particularly the areas surrounding their settlements. Although there is a recognition that this is mainly due to the lack of proper sewage and wastes disposal systems, this has not prompted local authorities to rectify the problems. Since squatter settlements are illegal, they are often treated as outside the control of local authorities and the legal system of building and planning.

The impact of environmental degradation on the socio-economic well-being of the urban poor is less obvious or highlighted in studies on squatters. Dahlan, H.M. (1991) and Ghazally and Murtedza (1990) in their studies on some riverine communities in Tawau point to the endemicity of diarrhea and cholera diseases in these areas. In addition, squatter settlements along riversides and the coasts are faced with the danger of floods and high water during the rainy seasons, while those near hillsides are faced with the danger of landslides.

Squatter settlements are not homogenous in terms of ethnicity and household income and would therefore be differentially affected by the poor environmental conditions. For example, the effects of overcrowding and congestion may be more negatively felt by those who are used to more open space, such as some rural-urban migrants. A significant number of respondents in Dahlan's study felt the lack of social space. It would be interesting to find out whether this lack of space for socializing and entertainment has any links with the emerging social problem of "lepak" which is rampant among city youths.[2]

The IDS study on squatter settlements within the Kota Kinabalu-Penampang conurbation reported that about half the respondents were satisfied with the condition of their houses and the environment. About 17 per cent felt the need for urgent action to address the unhygienic condition in their surroundings. The most pressing problem reported by the majority (67 per cent) of respondents was related to their inability to earn higher incomes from paid employment or small business activities.

Most of the studies revealed that the majority of urban squatters come from the rural areas to seek increased or better economic opportunities. In other words, the pull factor is often highlighted as the dominant rationale for rural-urban migration. There is no mention yet of people who are pushed out of rural areas because their environment or production base has broken down. This implies that environmental degradation as a result of development activities in the rural areas has not reached a stage where the livelihoods of rural people are threatened and they are therefore forced to migrate to the urban areas. But the emergence of ecological refugees has been noted in the region (ESCAP 1990) and future studies on urban squatters or urban poverty in Malaysia need to be more sensitive to the spatio-temporal effects of environmental degradation in rural areas.

Artisanal Fisherfolks

Since the First Malaysia Plan, it has been identified that the incidence of poverty among the artisanal fishing community is one of the highest in the country. The trend has been decreasing for the country as a whole except for Sabah. During the mid-term review of the Fifth Malaysia Plan, it was reported that the incidence of poverty among this particular community had increased by 6.7 per cent from 37.5 per cent in 1984 to 44.2 per cent in 1987. In comparison, the incidence of poverty among their counterparts in Peninsular Malaysia for the same period had decreased from 26.1 per cent to 24.5 per cent. Although no new official statistics have been released, concerns have been expressed by various quarters that this trend has not changed.

Various studies have been undertaken to determine the reasons for the persistence of poverty among artisanal communities (see for example Hashim, N. 1988; CAP 1990; IDS (Sabah) 1987; Tahir and Hays 1989 and Ishak and Chang 1986). One of the main factors cited in all these studies except for Ishak and Chang (1986) relates to the depletion of coastal fishery resources as a result of overfishing by trawler boats, harmful fishing methods like bombing, and the destruction and degradation of coastal resources such as mangroves and coral areas.

The resource base of coastal artisanal fisherfolks is limited in natural productivity and range. Effective management is needed to ensure that both the reproductive capacity of fishery resources and standing stocks are not over-exploited. The sustainability of fishery resources along the coasts of Sabah is threatened by the activities of too many trawlers which tend to damage breeding grounds and are not discriminating in the amount and types of fish they catch (IDS 1994; Galid, R.S. 1995). Between 1986 and 1992, there was nearly a

two fold increase (from 856 to 1,548) in the number of trawlers registered with the Department of Fisheries. Although fishing trawlers are regulated in terms of numbers and area of fishing by the Department of Fisheries, frequent encroachment of such trawlers into coastal areas are reported. Efforts to step up enforcement of the fishing regulations have not been successful due to the department's resource constraints.

Fish bombing which is an offence under the Fisheries Ordinance 1968 is commonly held to be rampantly practised by small scale fishermen. Discussions with the authorities concerned and with local fishing communities reveal that those from the illegal migrant population are more likely to practice this harmful method of fishing. Fish bombs not only kill fish of all sizes, they also cause extensive damage to corals and the marine environment.

The coastal areas of the State, particularly the West Coast, are experiencing rapid changes due to earthworks and reclamation for tourism projects. Large areas of mangroves and riverine and estuarine areas are affected. Although the impact of these developments on the reproductive capacity of coastal fishery resources have yet to be determined, practitioners and researchers in the fishery sector have expressed concern.[3]

It would seem from the above discussions that the environment of the artisanal fishing communities is being degraded by various activities, some of which emanate from developments in other sectors such as construction, tourism, industry and logging. There is not enough evidence to suggest that the artisanal fishing communities are stepping up practices that are harmful to their resource base.

If one were to consider that the number of fishermen remains fairly constant (IDS 1994) while the degradation of coastal resources has escalated in the recent past, then one could conclude that the artisanal fishing community were victims of environmental degradation rather than agents.

Shifting Cultivators

Shifting cultivation or more correctly rotational agriculture or swiddening in the context of Malaysia, is still widely practiced by the indigenous peoples of Borneo.[4] In Sarawak, 23.5 per cent of the State is said to be under swidden farming (UNESCO 1983). In Sabah, the Forest Inventory completed in 1970 estimated the coverage of rotational agriculture at 15.8 to 24.6 of the total land mass (Bhargava 1988). Shifting cultivators have been incorporated into State Development Plans as a social group that lives below the poverty line as a result

of an unremunerative farming system. Consequently, most of the state's development efforts have been aimed at settling them and encouraging them to adopt the modern farming system.

The view that shifting cultivators are unproductive and contribute to environmental degradation with their slash and burn practice has remained generally static among policymakers and planners. This is partly due to the lack of serious study and research on shifting cultivators in the State on the one hand, and to the harmful effect of these communities in other countries in the region, on the other. What is often not appreciated in most examples where shifting cultivators are the culprits of environmental degradation is that very often this is due to frontier migration in a land-scarce economy (Cruz. M.C. *et al.* 1992). The communities who migrate to the upland areas are usually the ones squeezed out of lowland areas and thus do not have the experience and skills needed to farm in an ecologically fragile environment. Research similar to those undertaken by Cramb, R.A. (1989a, 1989b, 1992) on shifting cultivation in Sarawak is urgently needed in Sabah, as the findings of Cramb's studies provide useful information for project planning to practitioners and planners besides dispelling some of the harmful myths about swidden farming.

The shifting cultivators' link to the environment is direct, as they create livelihoods from their surrounding resources, such as land and forest. General observations reveal that their farming system is coming under increasing stress with environmental changes in the rural areas. As a result, they have adapted their resource use to these changes. In the face of decreasing availability of land, most shifting cultivators have moved from an integral system of swiddening to one that can be described as "established swiddening" or rotational agriculture where tree crops in addition to a wide variety of food crops are grown.

An IDS study of 1379 hillpadi farmers who are also shifting cultivators reveal that the majority of the respondents do not possess land that have legal titles (IDS 1993). Shifting cultivators encounter numerous problems in the process of securing land titles. Their system of farming often does not fulfil the criteria of the state land application process which require applicants to show evidence of continuous occupation for three consecutive years. For those who do not grow cash crops, this would be impossible as their hillpadi growing cycle lasts only about one to two years. Only land which is cultivated with long term cash crops will receive titles and such land is usually small in size. This approach ignores the needs of shifting cultivators for land to cultivate their annual rice crop. Unless this need is taken into account when the state allocates land to shifting cultivators, these communities will continue to 'shift' their annual rice plots to the detriment of the environment.

It is now widely recognised that security of tenure or land ownership is an important requirement for the sustainable use and management of natural resources. For rural communities, management of natural resources and hence production is indistinguishable from that of the environment, as both form part of the livelihood strategy of the household or group (Redclift 1992). The State needs to adopt this approach in its management of natural resources and the environment. If the State ensures that the resource base of these communities is secured, then this will be an incentive for such communities to use their resources in a sustainable manner.

Orang Asli

The Orang Asli or indigenous peoples of Peninsular Malaysia number around 100,000, of which about 80,000 live in 778 settlements in all the states of the Peninsula except Penang and Perlis (Nicholas and Williams-Hunt 1994). The Orang Asli are not a homogenous group and have been classified into 18 different sub-ethnic groups, each with its own language and culture. About 40 per cent of the Orang Asli population live close to or within forested areas while the others have varied occupations such as fishermen, waged labour, and permanent agriculturalists of rubber, oil palm or cocoa farms.

The Second Malaysia Plan (1976-1980) identified the Orang Asli as one of the poverty groups in the country. Various studies have shown that the major factor contributing to their continuing poverty is the lack of legal ownership to their land (Hooker 1976 and 1991; Liow 1983; Hasan Mat Nor 1983; Mustapha, Z. 1986; Sham Sani 1986; Gomes 1990). The Federal Government is constitutionally empowered to establish land reserves for Orang Asli (Rachagan, S.S. 1990) but to date, only about 4,500 hectares have been gazetted for Orang Asli settlements, while the application from the Orang Asli to gazette about 55,000 hectares of land are still under consideration from the respective State governments (JHEOA 1991). Within land gazetted for Orang Asli settlements, the Orang Asli have no ownership rights except to the crops that are produced by them. The State reserves the right to develop the resources in these gazetted areas and also to degazette and resettle these communities in alternative areas when the need arises.

Besides the lack of legal ownership to their land, the Orang Asli's resource base has also been drastically reduced to such an extent that their simple commodity production system is threatened (Gomes 1992). In addition, rapid development projects such as plantations, logging and highways have also produced negative impacts on their environment. Studies by Sham Sani (1986), Sulaiman D. (1991/2), and Couillard, M. (1980) have described in detail how the

environment and natural resources of the Orang Asli have been degraded resulting, in greater dependence of these communities on the cash economy and the State for their everyday needs.

It has been argued by many authors and Nicholas, C., in particular that the Orang Asli have been unfairly blamed for degrading the forests (Nicholas, C. and Williams-Hunt, A. 1994). In fact the traditional rotational system of agriculture of the Orang Asli has been shown to be a scientifically and ecologically sound and efficient method of forest utilisation. Even if one were to take into account the shorter rotation cycle in the face of land scarcity, the degree of environmental degradation caused by the Orang Asli in comparison to large scale agriculture and other development projects is insignificant.

In summary, the literature on Orang Asli shows that they are adapting to the changes in their environment. Although they remain poor, there is no evidence to suggest that they have intensified the exploitation of the natural resources to such an extent as to cause serious degradation to their environment. Instead, many Orang Asli are developing increasing links with the wider national and world economy at the expense of their subsistence production, which is currently in decline (Gomes, A.G. 1990). Their traditional resource base and environment are being managed and developed by the State and private sector interests and minimal benefits are derived from such developments by these communities.

Discussion and Conclusion

Research on poverty and the environment in Malaysia has mainly been undertaken separately with little linkage between the two. Studies on poverty has focussed on the identification of poverty groups and the socio-economic characteristics of such groups. The studies which examine why such people were poor almost unanimously took an economistic approach and consequently list low productivity as a result of out-dated modes of production as the major cause of their poverty. The principal theme in the State's efforts to reduce poverty since the mid-1960s has been to increase the incomes of the poor directly and the provision of basic services. Some case studies have linked the poverty of the target groups to environmental factors such as the degradation of natural resources, but there has been little attempt to examine these linkages in greater detail.

A similar approach has also been taken by researchers working on environmental issues. Although the environmental factor has been injected into the country's development framework more seriously since the early 90s as a result of the UNCED, researchers have yet to respond to this paradigm shift. The research framework needs to be reformulated to enable researchers to establish that there is a direct link between poverty or development and the environment and to identify the various factors that influence the outcomes of such interaction in Malaysia's context.

It has been proposed in this paper that a multi-layered and dynamic analysis needs to be utilised for us to understand more fully the complex issues involved between poverty and the environment. As shown in Section 3 of this paper, our understanding at this stage is still very much incomplete, as there are gaps in information and data pertaining to many parts of this framework. In particular, we do not know how the poor have access to environmental resources as a result of their ownership, their own production, or their membership in a particular social and economic group and their ability to make effective use of these resources. We also need to know how the poor's environmental entitlements are affected by macro structuring processes such as national and international economic, social and political factors.

People's relationship with the environment is a social construct and is therefore context- specific and changes over time. This is well illustrated by the case studies of the shifting cultivators and Orang Asli who have adapted their production activities in response to changes in the environment. More micro-level studies of different communities in different localities may well reveal that the generalised responses of groups as presented in this paper differ greatly within and between groups.

The first step to an integrative approach to the planning and design of programmes addressing both poverty and environmental concerns is the need for an explicit conceptual framework linking the two issues. Cognisance of the process of interaction of the variables at both the macro and local levels has to be strengthened by context-specific data and information to safeguard against using generalised assumptions and outcomes in our policy and planning activities. Although there are gaps in the literature, there are indications from the case studies that the direction of poverty and the environment relationship does not necessarily result in a downward spiral in the context of Malaysia. This could be due to the fact that Malaysia is still a land-surplus economy with a relatively sparse population and that development efforts of the state to eradicate poverty with the introduction of modern technology and alternative livelihoods have made significant impacts.

Having said the above, it is proposed here that we may need to make changes in the way poverty is tackled in this country. In particular, a more direct approach towards poor rural communities who are still very much dependent on resources in their environment needs to be adopted. These people are actually de facto managers of the environment and natural resource base and hence more space needs to be created at the local level to allow people to participate more in planning and management processes. Given the appropriate policy environment, the rural poor can--and this have been shown by experiences in many instances--make rational decisions and take long-term views to create sustainable livelihoods at the household and group level.

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Notes

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[2] "Lepak" is a Malay term meaning "loafing".

[3] Participants at two seminars, "Regional Workshop on Planning and Management of Coastal Resources, 8-9 November 1994" and "Seminar on Sustainable Development of Fishery Resources in Malaysia, 12-13 September 1995", have expressed similar concerns.

[4] In Peninsular Malaysia, only the Orang Asli are practicing this form of agriculture

Chapter 6

The Story of a Mountain Tribe and a Dam: Focus on the Bugkalots, the Philippines[1]

Luzviminda B. Valencia[2]

Introduction

A small dam about 24 meters high and a transbasin underground tunnel is scheduled to be constructed in a site traditionally inhabited by an indigenous mountain tribe – the Bugkalots -in the Philippines. The situation is typical of a developing country's dilemma: the government attempts to bring 'development' to a poor area and provide irrigation water for 50 000 hectares of rice fields in downstream communities, but the project is potentially explosive as different interests come into conflict.

This chapter aims to delve into the problem of poverty and show how it relates to the environment, using the mountain tribe of the *Bugkalots* found in Nueva Vizcaya in the Philippines as a case. Related environmental concerns such as irrigation and land cultivation, and the more important issue of ancestral domains, are also addressed.

The paper emphasizes the links between poverty and environment, specifically how the mountain tribe of the Bugkalots copes with and manages its natural resources. It also discusses government efforts to alleviate poverty and scarcity through infrastructure projects. Actually, the project involves the construction of two diversion weirs in the Casecnan area of Central Luzon and Taang River to divert water through an approximately 25 kilometer long underground tunnel. The water will be diverted through the tunnel and released into the existing and currently underutilized Pantabangan Reservoir for irrigation use. In the process, the water will be utilized to generate energy at a new underground powerhouse and delivery to the Luzon grid (CE Casecnan Water and Energy Company 1995).

Section 2 gives a background and history of the area, the dam project and the Bugkalots. It includes a discussion about the environmental perception of the group, and the clash with a 'developmentalist' view. The section also discusses the relationship between the Bugkalots and the inmigrants to the area. Section 3 discusses the relationship between poverty and the environment in the area, focussing on five factors: (i) perceived insecurity over land tenure rights, (ii) logging activities, (iii) population and migration, (iv) education, and (v) status of women. Section 4 concludes, and suggests that indigenous groups, being poor, are always the subject of the most disconcerting aspects of 'development'.

Resistance to Dam Construction

In 1983, the government of the Philippines (ROP), through the state-owned energy and water corporation, planned to build a 100-meter high dam in the

Casecnan area of Central Luzon. The project also called for the utilization of 3,610 hectares for the reservoir area alone. This is the so-called CONWAP Dam Project to be constructed in Quirino Province where the mountain tribes called the Bugkalots live. They are the socio-linguistic group that has been identified in western books as head-hunters. The plan requires relocation of people, and it could cause serious flooding in the area. Fortunately, because of the opposition and united stand of these people, the plan failed to materialize.

Failure is attributed to the refusal of the Bugkalots to be cowed. They earnestly believe that the dam and the reservoir would eat up their ancestral domain. In their minds the irrigation project, while beneficial to the lowlanders, would mean the loss of their own traditional grounds. In 1994, the ROP presented the *Abaca Dam and Reservoir Project* but Bugkalots perceived it to be similar to the 1983 project except that this time, instead of 3,610 hectares, a mere 500 hectares was needed. The sturdy, kind, and honest people stood their ground. They were supported by their Council of Elders, the NGOs and the Catholic Church in their opposition to the Project. Obviously, the Bugkalots were torn between the need to help the equally poor communities living downstream who were projected to be the beneficiaries of the irrigation water and the desire to preserve their ancestral lands.

In 1995, the Philippines experienced a rice crisis. One of the reasons provided by the Department of Agriculture is the downgrading of the rice production due to lack of irrigation water in the traditional rice basket of the country. Hence, the proposed dam also means water will be utilized to generate energy at a new underground powerhouse and delivery to the Luzon grid for the use of the downstream communities. Surprisingly, while the Bugkalots themselves are agricultural people and rice-eaters, they do not look positively at the project, despite their understanding of the meaning of water to farmers and their farms. Are they just being obstinate and selfish in their refusal to accede to government plans? With the opposition, the ROP changed the plan by reducing the height of the dam from 100 to 24 meters and this time, no land was required for the reservoir. Instead, a tunnel, 25 kilometers long, will be dug underground. The change in plans symbolizes the victory of the Bugkalots. They succeeded in defying the government planners who thought that irrigation was a permanent solution to the chronic rice crisis.

History of the Bugkalots[3]

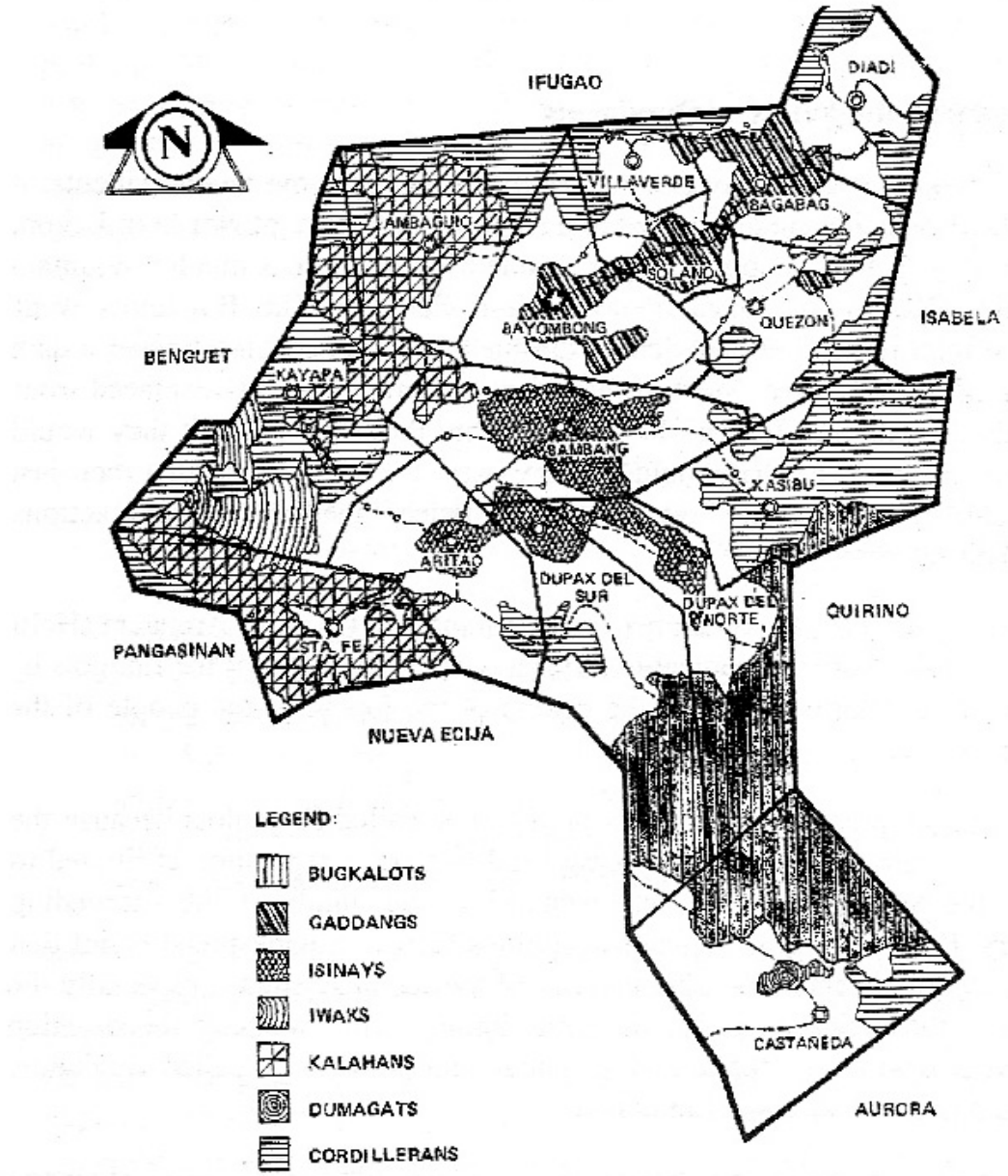
Who are these brave tribes who saw fit to oppose a government project? Early reports on these people used different names to refer to them. Some historians called them Italon, Abaca, Ibilao and Ilongot. However, the name Bugkalot,

although they are not mentioned in any early ethnographic reports, is self-designed. In this article Bugkalots and Ilongots are used interchangeably.

The homeland of the Bugkalot people is the headwaters of the Cagayan river, the vast area of eastern Sierra Madre shared by the borders of Isabela, Quirino, Nueva Vizcaya and Aurora. The territory's southern limit is the Caraballo range that separates it from Nueva Ecija. In the historic past the Bugkalot territory was penetrated by the Spanish missionaries through Pantabangan in their effort to build a road system from Nueva Ecija to the Cagayan Valley. Map 6.1 shows the areas which the Bugkalots and other tribes inhabit.

It was in the 17th century when a certain Fray, by the name of Casimiro Diaz, O.S.A., first made a reference to the Ilongot. He wrote that the Agustinians, beyond their 16 convents and doctrines in the province of Pampanga, have a large mission in the hill country of "warlike peoples who are being converted to our holy faith, called Italones, Abacaes, and Ituries and various others, who have been included to settle in several villages" (BR 37:141). Diaz again briefly mentioned that the "Igolot" were different from the Abacaes and Italones (BR 37:244).

Another Fray, Antolin de Alzaga (1706), an Agustinian apostolic missionary in the remote mountains of the province of Pampanga, was recorded to have converted and instructed the warlike peoples of Italones, Ituries and Abacaes (BR 42:254). Information from the Agustinian mission reports provided a detailed description of the Ilongot during the early contact period with the missions. The Agustinians wrote of their encounters with "two contiguous tribes: the Italons, a people fierce, brave, and bold: and the Abacas, who are somewhat less so". They live in settlements which consist of 56 villages that lie on the shores of two deep rivers, toward the north. They have a general language which is entirely separate from those of the Tagalogs and Pampanga. They have well kept villages, with high houses. They take great care of their fields and keep their grain in tambobos, or granaries, thus anticipating times of sterility and sickness. Fishing and hunting are abundant and good; the climate is temperate; and there are many beautiful plains. The people are kindly, but very warlike and of courageous dispositions; they are quite ingenious and hospitable (Mozo1968: 48).



Map 6.1: Tribal locator map of Nueva Vizcaya show the areas where Bugkalots inhabit

It was, however, Blumentritt (1930:36090) who distinguished the Abacas, Italonons, Ibilaos and Ilongots from each other based on territory, physical build and cultural practices. However, he pointed one similarity among the four – all of these tribes were head-hunters.

These distinctions continued from the early historical writings starting from the turn of the century to modern ethnographic reports.

The "Modern" Bugkalots as Opponents

The 1983 project was bitterly resisted by the Bugkalots who were residents of three villages which were all located in a small municipality of Northern Luzon, while the 1994 plan was opposed by the same tribe living in a smaller mountain community (Barangay Lipuga, Pelaway, and Cauyan). The Bugkalots went through similar relocation experiences during a previous construction of a dam under the Marcos Regime. Most of them were unceremoniously displaced from their traditional homes. Hence, they swore, from that time on, that they would never agree to anything that would one day harm them again and that their last stand would be where they are now. And, indeed their consequent actions proved their intentions.

Pedro V. Salgado (1994), a member of the Saranay Ti Umili iti Amianan (Help the People of the North) organization, tries to justify this stand of the Ilongots by examining the historical roots of the people of the forest, or the people of the mountains.

He said that the present day Ilongots prefer to be called Bugkalots because the former name carries the stigma of being head-hunters, a reputation attributed to them by the Spaniards and which persisted in the minds of the succeeding colonizers. Even among the educated Filipinos there is a widespread belief that indeed they are headhunters. The majority of the social scientists, especially the linguistic anthropologists, prefer the name Ilongot. Thus we have the situation where the people of the forest and the mountains want to be called Bugkalots while the outsiders call them Ilongots.

It was the Spaniards that stereotyped them as "bloodthirsty savages" (Salgado 1994) whose joy was to cut off the heads of Christians. He cited the works of a certain Ramon Jordana Morera that describe the Ilongots as extreme cowards, thirsty for the blood of their enemies, implacable to defenceless victims, and vindictive by tradition. They give hospitality to no one, they even destroy each other. The Spanish writers did not explain why these people hunted heads. Rosaldo (1986) provides clues in the realm of both anthropological and

psychological schemes as to the nature and reasons for headhunting (Morera 1885). The author believes that the practice itself is a status symbol and the act itself provides a release from anger and excess energy. Still, the people do not openly discuss headhunting with outsiders. There is a lot of spirituality in the mission of headhunting that is not clear to outsiders. Rosaldo finds it incongruous that these same people whom she describes as generous and kind would be capable of savagery to a point of being labelled as killers. To her probing "Why", the respondent replied with a dull 'It is our custom as if acknowledging, or asserting the limits of our talk'. To explain a cultural practice by another cultural action will not elucidate what needs to be explained. The Ilongots were traditionally said to have a 'deep psychological satisfaction in killing, in slashing victims, and in severing and tossing to the ground a human head':

> *Although the timing and style of killings differ, their place in autobiographical reflections tend to have a constant shape. Of well over 100 raids of which we have good data, none in the last 50 years has been without at least one 'empty-handed' youth, or 'novice' (*siap*), and very few have lacked the guidance of adults. Furthermore, although a minority of men have had occasions to take more than a single head during a lifetime, the presence of 'knowing' seniors has helped to guarantee that at least one novice takes a head on each successful raid. Thus, the personal and age-specific goals of youth merge with political designs and needs of elders; and just as young men hope to 'reach' the* liget *of their fathers' prior efforts before they marry, so accomplished head-hunters find in grief, in their care for 'sons', or in more enduring feuds and grudges a reason to guide young men on a raid* (Rosaldo 1986:137-8).

Salcedo (1994:17) had a contrary interpretation of Bugkalots. He said that, while the Bugkalots gave no quarters to their enemies, they were actually kind and hospitable to the lowlanders who asked for their friendship. He also added that far from being savages, the Bugkalots were reasonable people. While Rosaldo explains headhunting as part of tradition, of customs handed down from generation to generation, from fathers to sons, Salcedo gave different reasons for the practice. As early as the Spanish times, the Bugkalots needed to be brave and demonstrate that bravery in defence of their land. The Bugkalots' land provided so much for them, but slowly they were surrounded by other tribes and lowlanders. They have to hold on to their land, and to defend it: the forests, the mountains, the fields. They need to kill if necessary. Thus, very early in their lives, the young Bugkalots internalize bravery. Young men, who had *not cut any head, were hungering for the beheading of enemies, while*

parents hoped for the day their young sons could fulfil such missions (Salcedo 1986: 24).

The Context of Survival and the Nature of the Opposition

The Bugkalots of the three barangays were in the forefront of the opposition to the 1994 dam projects of the State-owned energy and water institutions. According to the planned 1983 dam project, 25% of the Bugkalots would have faced displacement from their traditional homes to give way to a reservoir. For the government, it did not matter that these original inhabitants of the area would be displaced, because the scheme would indeed have served the needs of the community at large through irrigation, power and flood control for the downstream communities. Little did the government know that in the past, when pushed into a corner, these people would kill to defend their lands. History talks of this tribe beheading strangers and other tribes when they pose threats to its tribe's survival.

The first Environment Perception Survey Research (EPSR) was conducted in 1986, barely two years after the 1983 plan. The research was conducted to obtain the baseline data or values of social parameters, such as health, education and lifestyles against which social change can be predicted if and when the project is instituted. Usually, an EPSR is conducted on a continuing basis so that its results can be used for predictive and planning purposes.

Salient Points of the Perception Studies

Incorrect information

The EPSR of 1986 concluded that a majority of the Bugkalots favoured the project and were willing to be relocated. However, the NGOs and the Catholic Church organizations objected. They believed that the survey could not possibly make the generalization, because seven villages were difficult to access and they were not convinced that the people living in the site were consulted. They also argued that the report even admitted that one of their biggest constraints was the inaccessibility of the area to researchers. Also, the opponents knew that the Bugkalots do not entertain outsiders carrying questionnaires about the tribe. The Bugkalots' cultural system considers the valley that they occupy as their ancestral lands. And, like their ancestors who lived there for generations, they are hunters and bamboo and rattan gatherers, and practice swidden farming and shifting agriculture.

The second EPSR was conducted in 1995 to determine the Bugkalots' perception of the proposed dam. The locale of the study nonetheless concentrated on the Dam Influence Area or, in the technical jargon of the Environmental Impact Assessment, the Primary Impact Zones (PIZ). The PIZ consists of a corridor which encompasses the physical area surrounding the powerhouse, tunnel area, diversion structures and access roads (CE Casecnan Water and Energy Company 1995). There are only five *barangays:* three are located near the diversion structures and two are near the access road. In the new design the main zone is a small village that nestles on top of a mountain, where on a clear day one can almost touch the sky. Here, the villagers draw their water from the mountain spring, and bathe in the clear, flowing water of the nearby river. Life is nonetheless far from idyllic because there is so much scarcity in everything, from food to soap to sugar and salt, yet, there is so much dignity in the way the villagers deal with their problems. The forest cover is down to 22%, the wild animals they used to hunt for their protein source, such as *labuyo* (wild rooster), *usa* (deer) and *baboy ramo* (wild boar), are now almost gone. The rivers that used to provide abundant fish seem to have run dry. Hence, the question is:

> Are Bugkalots poor because of the continuous depletion of their resources? Or is the resource depletion caused by poverty? Why are they still objecting to a project that now calls for only a 24 meter high dam and no land required for the reservoir?

Who are the Poor?

"Official poverty" incidence estimates and "subsistence poverty" incidence estimates in the Philippines started in 1987. The more recent official poverty line applies to the years 1988 and 1991. When a family's income does not even cover the cost of its basic minimum food needs to ensure adequate nutrition of each household member (i.e., 2,000 calories per day and 80 to 100 percent of vitamins and minerals), then the family is considered *subsistence poor* (Intal and Bantillan 1994). If the family has enough income to cover its subsistence food needs, but not its basic non-food expenditures[4], then the family is considered *officially poor*. The incidences of poverty and subsistence poverty refer to the proportion of all the country's families whose incomes fall below the official estimates of the poverty line (or threshold) and subsistence poverty (or food threshold). Definitely, the Bugkalots are in the state of subsistence poverty (Table 6.1).

Item	Quantity/Description	Price (pesos)	Price (dollars)
Corn	per cob/piece	4	0.15
Sitao	per kilo	10-18	0.39-0.69
Unggoy (monkey)	small	500	19.23
	big	800	30.76
Usa (deer)	"live weight" 50 kilos	3,000	115.38
	tapa (dried)	200/kilo	7.69
	5 kilos	1,000	38.46
Baboy Ramo (wild boar)	"live weight"	3,000	115.38
	tapa (dried)	200/per kilo	7.69
	5 kilos	1,000	38.46
Labuyo (wild chicken)	"live"	300	11.53
	dressed	150/kilo	5.76

Table 6.1: Available food-items in the village, quantity, description and price in 1994

Source: Valencia (1994).

Land Claims were Forgotten

While changes in the plans of the government were dramatic enough, the poor Bugkalots felt that all of these claims do not address their land claims. So, poverty is not going to push them into agreeing to a project that means a loss of their traditional grounds.

They demanded the declaration of their lands alienable and disposable by virtue of their ancestral and tenure rights. The plea for security of land tenure, respect for land rights and the rights of the next generation led to the formulation of their motto that says, "*Our Land, Our Life, Ours to Defend*". As aggressive as it appears, it is still tame compared to their old practice of headhunting when their survival was threatened. At present, the Bugkalots dare not go back to the practice of headhunting, which they abandoned only in the late 1970s. It did not matter that most indigenous people enjoy, at present, the government programs like the Integrated Social Forestry Program, the Certificate of Land Ownership Award, and the Certificate of Ancestral Domain Claim. Although this last program is the most difficult to obtain, it is now the focal point of disagreements between the mountain people and the government. The survival instinct among

the Bugkalots is as sharp as it was before, but the mechanisms to attain their goals dramatically shifted from violence to non-violent tactics. Instead of headhunting, they are now working towards recognition of their claims over their ancestral land rights

Clash of Perceptions

The differential perceptions of the entities as to the benefit of swidden farming, or the *kaingin* system are a source of conflict. This system of land cultivation is destructive according to the government, but among the mountain people it is not because *kaingin* agriculture had been practiced in the past and they have benefited from the system. Because the government adheres to the knowledge that the kaingin system of farming is destructive, it is bent on making these people adopt sedentary agriculture. They want the change to take place immediately. To enforce the change, they are thinking of putting a ban on shifting cultivation. The government represents the dominant and superior culture and when they "encourage" the Bugkalots to shift from dry to wet cultivation of rice, and to adopt sedentary agriculture, this is considered a show of power.

The Bugkalots are of the opinion that the government should regulate and control the logging activities of the concessionaires with timber logging licenses instead of asking them to stop practicing swidden farming. They argue that their ancestral lands are not merely a 'watershed haven'. However, the poor people's argument – with their voices now hoarse – were shouts of "what price water, what price energy?" No one seems to listen.

Bugkalots and the Influence of In-migrants

The link between poverty and environment is very prominent among the indigenous people of the country because their kind of poverty is dramatically shown by their lack of control over traditional resources that include land, forest river and mountain. The resources are usually controlled by a dominant group, such as the government, the private developer, or the legal or illegal logger. The Bugkalots are not exemptions, because similar tribal groups live in subsistence poverty in mountains and depressed areas. All of them are marginalized and vulnerable to the onslaught of modernization and its consequences. Except for the religious conversion that took place under the influence of the New Tribes Mission in the mid-1950's, the tribes did not have initial contacts with the

government but rather with loggers. The tribes continued to survive by being logging-independent.

One can, however, argue that the introduction of both legal and illegal logging in the forest area contributed to income generation no matter how temporary this was. The holders of timber license certificates issued by the government provided jobs to some tribesmen. In fact, the tribesmen were very useful to the concession owners, as they were excellent 'spotters' of the location of trees. They knew the terrain and were hardworking people, so concession owners employed them willingly. Of course, the tribal people reacted initially to the strangers (the loggers) with fear and bewilderment because it was not in the nature or cultural practice of the Bugkalots to entertain strangers or to lend hospitality to people they did not know.

Even today, the Bugkalots view the influx of migrant workers to their communities as dangerous to their sense of security. Therefore, to be effective, the so-called development projects aiming to help the Bugkalots and other traditional people need to be contained within their world view. On the other hand, is it possible that the traditional social structure of indigenous people leads to the maintenance of their present-day poverty? Is there something in their norms and belief systems that is inconsistent with the requirements of modern life? Is it correct to assume that the persistent poverty associated with the traditional people is itself a by-product of the refusal to let go of some of their stereotypical thinking of the outside world?

Links between Poverty and the Environment

This study points to five social factors that bring about poverty, and poverty's consequences for the environment. These factors are (i) perceived insecurity over land tenure rights, (ii) logging activities, (iii) population and migration, (iv) education, and (v) status of women. These are discussed below.

What are the social factors that bring about poverty? What are its consequences for the environment? Unfortunately there is always a dearth of data in general at the village level to arrive at a generalized statement even if it is an *ad hoc* one. One of the reasons for this is inaccessibility.

Most areas are inaccessible to researchers and government people tasked to collect primary data. For example, the many Bugkalot villages are accessible only by helicopter or on foot. Under normal weather conditions, the trip takes at least five days, as illustrated by how the case study in a particular village was conducted as part of the 1994 opposition to the development plan. One needs to

cross rivers in a small boat, or one walks along the riverbanks, or transverses the dangerous slopes of mountain sides. One of the key informant-residents narrates sleeping overnight under a makeshift and portable bamboo hut. Under these conditions, it is no wonder that primary poverty statistics anchored on flesh and blood people is absent (Castillo 1993), thus making poverty-targeted approaches suspicious. The National Census and Statistics Office conventionally uses a 10% random sample sized strategy that often excludes the population of groups that occupy difficult topography. This data gap needs to be bridged urgently.

The United Nations Conference on Environment and Development (1992) recognized the need for accurate data/information at all levels so that informed decisions can be made. Data deficiencies both in terms of availability and quality make it difficult to ascertain the social factors that bring about poverty.

Ancestral Land Claims and Perceived Insecurity over Land Tenure Rights

In the case of the indigenous group, the biggest sociological basis of their present day difficulties is the ancestral land issue. Ancestral land may be defined as an area used for habitation and economic activities by a community of people sharing the same socio-cultural values and practices (Aldana 1988). Lawyer Jefferson R. Plantilla of the Structure Alternative Legal Assistance for Grassroots Discussion, a non-government organization, talks of the concept of ancestral lands and its legal implications and concludes that the latest land law defines ancestral land as the following: public domain that has been in open, continuous, exclusive, and notorious occupation and cultivation by members of the national cultural communities directly by themselves or through their ancestors under a *bona fide* claim of acquisition of ownership according to their customs and traditions for a period of at least 30 years from the date of approval of P.D. 410. Ancestral lands are public lands, and only the grant of the state can give the people concerned the right over them. Conversely, according to Plantilla, the state can award the land to any person who can present proof to acquire the land.

This new law brings fears to the Bugkalots and other indigenous groups. They are afraid that the state will award the land to others who, because of better education, can organize proofs of their qualifications to acquire the lands in question.

On the other hand, ancestral domain refers to the area that has always been known to belong to them. It consists of their settlements, forests, *kaingin*s (slash and burn), mountains, hills, rivers, and hunting grounds (Anthropological Association of the Philippines 1995). Given this perspective, the Bugkalots and

other indigenous groups believe that they own the forests and rivers that will be the "physical area" surrounding the tunnel area, diversion structure and access roads.

The Cordillera Studies Center of the University of the Philippines College of Baguio, defines the indigenous word 'land' to encompass the following three dimensions: (i) the different land use systems; (ii) the legal and other problems faced by indigenous peoples and communities regarding land; and (iii) the strategies they have to formulate so they can carry out their quest for the recognition of their ancestral rights (Chaloping 1992). All territories exclusively possessed, occupied or utilized by indigenous cultural communities in accordance with their customs and traditions by themselves or through their ancestors are ancestral (ibid, p.3).

Both Spanish and American colonizers altered dramatically the world view and consequently introduced a land system that was totally foreign to the culture of the original inhabitants of the Philippines. As a consequence, the colonizers not only dispossessed the material property of the native population but also deprived their inheritance and control over the lands. For many of them control has psychic meanings, for it provides them a feeling of security amidst economic deprivations that exist in their communities already bereft of the basic essentials like good food, housing and health care.

The link between land and people is reflected in the native population's belief and value systems, technologies and social institutions of generations ago. These lands were handed down from one generation to the next by the strength of their customary laws. This is the very essence of the survival of the Bugkalots. In the past, they resorted to headhunting when their survival was threatened.

Logging-dependent Economy Leading to Forest Depletion

Without land security, the indigenous groups like the Bugkalots can not pull themselves into a modern market economy. At present, they survive off the land but at a great loss to their sense of well being. Legal and illegal logging, introduced to their lands by powerful people, have continuously undermined their cultural and behavioural practices. This is, of course, true not only for the Bugkalots but for all cultural minorities in the country. A consideration of a wide range of possible effects arising from the logging activities shows that their immediate impact is the improvement of the livelihood prospects among those living in the watershed areas. It is safe to conclude that logging, whether

legal or not, is contributory to poverty enhancement because it depletes the forest cover and causes soil erosion.

The forest depletion factor (Figure 6.1) is a critical concern not only to the Ilongots but also to all of the Cordillera peoples (residents of the Cordillera Mountains of Nueva Vizcaya and Pangasinan). Most Bugkalots are farmers cultivating small rice fields. According to their concept of land ownership, land belongs to those who cleared the area first. Nonetheless, without the forest cover the soil is subject to continuous erosion that renders it unproductive over time.

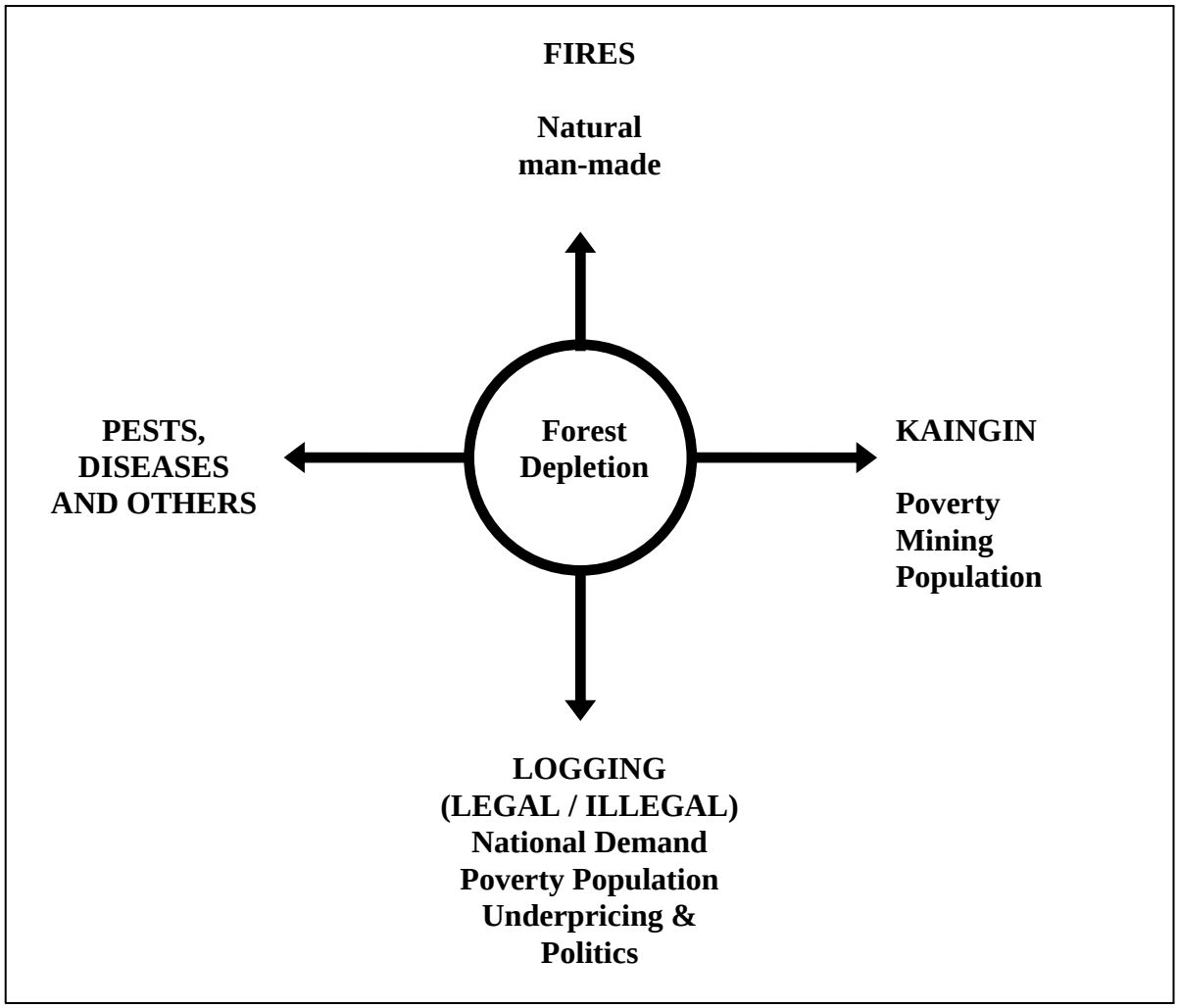


Figure 6.1: Forest depletion factors

The Bugkalots defend their shifting cultivation method by claiming that logging damages the environment to a much larger extent (see also *Clash of Perceptions*). Table 6.3 and Figure 6.1 shed some light on the different claims of the contributions of logging and shifting cultivation to deforestation in the Philippines. Between 1980 and 1988 the highest contributor to deforestation was forest fires. This is so even if one disregards the forest fires of 1983 which alone deforested 1.180 km^2. Logging and shifting cultivation are estimated to be the second most important contributors to deforestation. The share of logging increased in the latter part of 1980s. However, the figures should be interpreted with caution. First, some deforestation, for example due to illegal logging, is not reported. Second, the figures of "slash and burn" are uncertain because of lack of data, and it is not clear if fallow forest cut for cultivation is considered deforestation (which may give 'double counting' over time).

Year	Forest fires	Logging	Slash and burn	Pest and diseases	Others	Total
1980	183,2	73,5	63,0	1,1	5,5	326,4
1981	124,7	61,1	58,3	2,0	0,0	246,1
1982	80,6	49,5	32,9	3,5	0,0	166,5
1983	1179,5	10,2	22,4	1,2	0,0	1213,3
1984	31,8	4,8	11,4	0,1	1,0	49,0
1985	117,4	19,2	9,4	0,3	0,0	146,3
1986	42,6	0,9	19,9	13,4	0,0	76,8
1987	53,9	6,8	5,7	0,0	5,1	71,5
1988	4,2	44,7	29,1	0,0	24,4	102,6
Total	1818,0	270,6	252,1	21,6	36,1	2398,4

Table 6.2: Reasons for deforestation in the Philippines from 1980 to 1988 (km^2)
Source: Forest Management Bureau

Most of Bugkalots and other indigenous people augment their source of income by hunting and gardening vegetables. Hunting is assigned to the men while gardening is by convention a woman's job. At present, hunting animals like wild deer and boar is beginning to be a lost art and a dying tradition of showing-off skills. This is primarily because the forest is depleted and the animal population has decreased dramatically. Government has also banned deer hunting. The forest is indeed the *Heart of the Ecosystem*, without which man and nature are lost.

Sometimes, forest people explore their fishing grounds, and in this particular territory they use nets and fish traps to catch fish for their protein source. Young women indulge in fishing activities and use goggles (*antipara*) and spear guns if available. They go out at night to fish with the aid of lamplight, or flashlights to attract shrimps and fish. Thus fishing activities cut across gender boundaries. So, nowadays both men and women fish and, if lucky they can, catch mullet, eel, gobi, catfish or jacket fish. However, they do not sell their catch, as it is often barely enough for the family consumption, unlike generations ago when the rivers provided food and indirect income, as Bugkalots were able to sell their catch. Then the rivers were not silted and turbid. Now, the rivers have been the route of illegally cut logs that are pushed down the face of the cliff. This operation leaves hillside marks or scars from the logs skidding, causing heavy erosion.

Perceptions surveys reveal that the Bugkalots' only source of regular income is the sale of rattan. Based on an average of 200 pieces of rattan (rattan gathered monthly per family) their monthly income is estimated at 666 pesos (roughly $27). This is used to pay for laundry soap, salt, sugar, coffee, bread, cooking oil, clothing and transportation. The cost of each item is shown in Table 6.3.

Item	Price in Pesos	Price in Dollars	Duration of consumption
Asin (salt) one ganta; 3 liters dry measure	12	0.46	15 days
Asukal (sugar) 1 kilo	28	1.08	
Kape (coffee) 50 grams	28	1.08	daily
Tinapay (loaf of bread) (Pan Amerikano)	28 -29	1.08	
Mantika (lard) 1 gallon (Spring) 1 bottle	140	5.46	
Sabong panlaba (laundry soap bar) (e.g. Perla - isang bareta, 4 pieces)	25	0.96	3 days

Table 6.3: Price of consumption goods and the duration of consumption, 1994
Current exchange estimate $1 = P26 (fluctuating)
Source: Valencia (1994).

Population and Migration

Population is one of the most critical variables in the poverty - environment nexus. The single most common denominator among poor countries is that all have rapid population growth. Being poor means having an uncontrolled population growth. Having a huge number of mouths to feed means there are not enough resources to share. Consequently, the country sinks deeper into the quagmire and scarcity. One then begins to theorize whether high population growth initiated poverty or *vice versa*.

In the case of the indigenous groups the problem is aggravated by the influx of people from the other equally poor communities of the country. There is an accumulation of data reflecting the increased social movements of poor people into the mountain valleys in search of the proverbial greener pastures. There is a perceived abundance of lands and job opportunities in the areas traditionally inhabited by the so-called *katutubos* or natives.

The Bugkalots' territories are no exemptions. Their natural reticence towards strangers does not discourage the non-natives from invading their lands. However, in some cases there are places like those occupied by the *Kalanguyas* in Santa Fe, Nueva Vizcayam where many people have already assimilated with settlers.

In this context, the nature of the indigenous groups' opposition to any governmental development project becomes understandable. These projects serve as the magnet of attraction for others to come because this is the time when the hiring of laborers is at its peak. Problems associated with migration such as overcrowding, worsening of health and sanitation conditions (already well below standards initially), and some forms of social conflicts are expected. This explains also why the Bugkalots are in a hurry to have their ancestral land claims settled quickly. They fear that the migrants will one day impose their will on their lands. Then what will happen to them? The Bugkalots will remain poor, or worse, become even poorer, or worse still, they will lose their ancestral possession.

The pressures of population and in-migration to the areas is shown in Tables 6.4a and 6.4b. The population densities are the highest in the Central Luzon region including the Nueva Ecija province. Thus, the area of Bugkalots faces potential migration pressure from that area. The population densities in the Cagayan Valley region are small, particularly in the Quirino province. However, the in-migration to Quirino and the neighbouring Alfonso Castaneda is also high. In 1990, 6,1% of people over five years of age living in the Quirino region

had lived outside the province five years earlier. Even if the Bugkalots do not know these figures, they feel that the pressure is mounting and their land is under attack from the outsiders.

Region/*Province:*	Land Area km^2	Population (000) 1990	Population per km^2 1990	Population growth 1980-90
Cagayan Valley	26.838	2.341	87,2	2,1%
Nueva Vizcaya	*3.904*	*301*	*77,1*	*2,2%*
Quirino	*3.057*	*114*	*37,3*	*3,2%*
Central Luzon	18.320	6.199	340,0	2,6%
Nueva Ecija	*5.284*	*1.313*	*248,4*	*2,1%*

Table 6.4a: Population and land area in Nueva Vizcaya, Quirino and Nueva Ecija in 1980 and 1990

Source: National Census and Statistics Office

	Place of Residence Five Years Ago					**Population (000) over 5 1990**
	Same province		Other Province	Abroad or n.a.	Total	
Province/*City:*	Same City	Other City				
Nueva Vizcaya	95,3%	1,1%	3,1%	0,4%	100,0%	259
Dupay del Norte	*96,7%*	*0,9%*	*2,0%*	*0,3%*	*100,0%*	*18*
Dupay del Sur	*96,7%*	*1,1%*	*1,9%*	*0,3%*	*100,0%*	*11*
A. Castaneda	*94,0%*	*0,2%*	*5,6%*	*0,2%*	*100,0%*	*3*
Quirino	92,1%	1,1%	6,1%	0,8%	100,0%	98
Maddela	*92,8%*	*0,4%*	*5,2%*	*1,5%*	*100,0%*	*22*
Nueva Ecija	97,1%	0,9%	1,7%	0,4%	100,0%	1.141

Table 6.4b: Migration to Nueva Vizcaya, Quirino and Nueva Ecija, 1990

Source: National Census and Statistics Office.

Education

An essential condition for making the level of poverty worse is the low quality of education available to the population in the area where Bugkalots and other

tribes live. A first hand encounter with the village primary school tells immediately the quality of education available. Picture a schoolroom with a blackboard at the center of the room, a few pieces of chalk and an eraser. The schoolhouse is a one-room affair; if lucky, the roof does not leak. The desks, though still standing, are no longer sturdy and most of them are about to collapse. The schoolteacher (at the time of the survey) was male, about 35 years old and a non-native. According to the parents of the schoolchildren, he is more often seen outside the school then inside. When interviewed he said he was about to quit as he did not find any potentials for personal growth in his present assignment. So he spends his time travelling to the central office to follow-up his papers.

At the time of the survey there was only one student in the area with a junior-secondary level education. The profile of the educational status of this village typifies all if not most of the educational settings of remote places. If education is seen as the route out of poverty then what we have now is not going to be an effective means of breaking the vicious cycle of poverty. National data showed that out of 100 first-grade entrants, 11 will reach college level, and out of this number only one will graduate. As a ladder for social mobility, education is no longer suitable to climb.

Status of Women

Literature abounds on the quality of life of women in the downstream communities, but the status of women among the indigenous groups has not been analysed. Suffice to state that women in indigenous tribes shoulder more burdens than their peers in the lowland communities. The mountain women face more serious problems of survival than the rest of their colleagues living downstream. They do not have recreational facilities or support groups, and they are more isolated than those that live in the center of things.

Some Conclusions

In a world of high speed environmental devastation, special efforts to improve the social and economic status of the indigenous people is a priority. Yet, this statement is premised on our classic thinking that the deterioration of the environment of the socio-linguistic groups is what brought on the initially extreme poverty. It is possible that the recent, sometimes emotional if not dramatic, opposition to industrial plans of the government by the tribal people is a reflection of the extreme feelings of powerlessness in the face of social changes that meant loss of structural control over their family and community lives.

The nature of the relationship between poverty and environment can take on different bearings. One posture of the relationship is analogous to having two parallel lines running along a given space, but these two lines never meet. The gap between the two lines remains. If one of the lines puts on additional speed the gap will still be the same. The scenario emphasizes the mutual but negative complementarity of the two variables. In a nutshell, planners mandated to address the needs of the poor in general do so by the expansion of the opportunities to enable the poor to upgrade their present situation. How best to accomplish this is oftentimes the source of tension and outright violence.

The government or the planners in general are like Sisyphus, the king in the Greek myth who as a punishment had to roll uphill a heavy stone which always rolled down again, no matter what the king did. The task of providing poverty alleviation measures with the aim of mitigating the impacts of environmental depletion is Sisyphean in character, a frustrating, endless, and backbreaking exercise.

The connection between poverty and environmental resource degradation is cyclical. Or it could be that they are linked like entwined Siamese twins. Hopes to separate them are only through drastic and radical surgical intervention. In this case, strong political decisions and the commitment of the entire nation towards mitigation of the repressive factors of poverty are required. At present the government of the Philippines plans to form a new commission to target poverty woes consistent with the recommendations of a study conducted by the Asian Development Bank. This study stated that 70% of the rural people live below the poverty level. Unfortunately, the figure is not disaggregated to show whether the indigenous groups are included in this estimate.

The link between poverty and environmental resources can be modified so that subsistence poverty among the mountain tribes, such as the Bugkalots, will not

cause further damage to an already compromised environment. What will happen to the Bugkalot's claim on their ancestral land?

The findings of this study indicate that the poor are always vulnerable to exploitation and discrimination no matter how subtle the discrimination is. The indigenous groups, being poor, are often the subject to the most disconcerting aspects of 'development'.

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Notes

[1] The *Bugkalots*, who are also called the *Ilongots*, are the "head-hunters" of Nueva Vizcaya, the Philippines.

[2] I would like to thank Arild Angelsen and Matti Vainio for constructive comments and suggestions which have improved the paper.

[3] This chapter is based on the notes of Professor A. Padilla, Filipino Anthropologist, University of the Philippines (Manila), 1994.

[4] These include clothing, footwear, housing, utilities, medical care, education, etc. but exclude expenditures on alcoholic beverages, tobacco, durable equipment, recreation etc.

Chapter 7

Poverty and Deforestation in the Congo Basin Rainforest

François E. Ekoko[1]

Introduction

Rural people in Africa are facing a dilemma of poverty and environmental depletion. Unlike the Sahel region where awareness was raised in the 1970s, the forest area situation was understated until the early 1980s. A small but useful literature has begun to emerge in the late 1980s and early 1990s (e.g. Leonard et al. 1989 and Leach and Mearns 1992). Yet, the focus remains on the broad issue of poverty and environment linkages. Specific research aimed at determining the correlation between rural poverty and deforestation, as well as the underlying factors of such linkage, remains embryonic.

Early analyses on the link between poverty and environmental depletion have established that first, there is a *correlation* between poverty and environment (WCED 1987) and secondly, there is a *negative* link between poverty and environmental depletion (WCED 1987 and UNDP 1992). Poor people are said to be both victims and agents (active or passive) of environmental degradation (Mearns 1993; Harrison 1992; Woodhouse 1992). In the case of Cameroon, the World Bank (1989) estimates that about 1 000 km^2 of forest is cleared every year for agricultural purposes, both for cash and subsistence crops.

This paper, which focuses only on the assumption of the negative link between poverty and environmental depletion at the individual level, attempts to bring a "nuance" into the assumption and to establish the mechanisms and conditions under which poverty *could* lead to deforestation. It attempts to set an alternative framework for analysing the link between poverty and deforestation, and the mechanisms behind that link.

Section 2 explores different concepts of and attempts at measuring poverty. Section 3 describes the survey area and the methodology used. In section 4, the attitudes towards the forest among the groups included in the study are compared. Section 5 makes a number of observations based on the study and secondary data, which questions the hypothesis that poverty leads to deforestation. If correct, one would expect that the poorest of the poor in the Congo rainforest, the Bakas, would degrade their environment more than other groups. This is not the case. Moreover, the rate of deforestation due to agricultural conversion in Eastern province, the poorest region in the Cameroon, is very low. In section 6, five possible factors explaining why poor people would deforest are considered: (i) the existence of markets and high demand, (ii) changes in cultural values, (iii) development of infrastructure, (iv) inappropriate public policies, and (v) lack of property rights of the natural resources.

Exploring the Concept of Poverty

No widely applicable definition and measurement of poverty has been accepted by the majority of scholars. There is a confusion between the concepts 'poverty' and 'deprivation'. Townsend (1987:125-6) explains poverty by referring to deprivation:

> *"People can be said to be deprived if they lack the types of diet, clothing, household facilities and fuel and environmental, educational, working and social conditions, activities and facilities which are customary, or at least widely encouraged and approved, in the societies to which they belong."*

But they are said to be poor if they lack or are denied resources to obtain these conditions of life (Townsend 1987:140 and 1993:36). Piachaud (1987:147) suggests a framework encompassing three approaches which could help in defining the concept of poverty, that is, the social consensus, the budgetary measures, and the behavioural approaches.

Poverty may be absolute or relative. Absolute poverty refers to people whose income is insufficient to obtain the minimum necessities for purely physical efficiency. On the contrary relative poverty is defined by the ability to live according to cultural norms and expectations or contemporary standards of living measured according to the median income of the society in which it occurs (UNEP 1995:16).

Development agencies have developed two broad approaches for the measurement of poverty: the head count ratio and the basic needs. The head count ratio approach is related to the classical perception of development. Development is seen as a process of accumulating goods, thus poverty will be the lack of income or wealth. The measurement *par excellence* is GNP per capita. This approach is widely used by the World Bank. The measurement of poverty is based on income and consumption levels that can sustain a bare minimum standard of living based on caloric intake. The World Bank acknowledges the limitations of its approach as it implies that non market factors such as household subsistence production are not taken into account, as well as services provided by the local community or the state. Any individual whose income is below the poverty line is considered to be poor. In 1990, the poverty line was US$ 275 per year.

The basic needs approach stresses social indicators. In the past, many fruitless attempts have been made to measure poverty using different indexes. In 1976 Sen launched the Integrated Poverty Index (IPI) and in 1979, Morris suggested the Physical Quality of Life Index (PQLI). More recently, UNDP and IFAD have developed new tools to measure poverty. UNDP has initiated a Human

Development Index (HDI), based on per capita income, adult literacy, and life expectancy. IFAD has proposed a Relative Welfare Index (RWI), using four macro-level indices that measure food security, the depth of poverty and the extent to which basic needs are being met. Alongside these definitions, people have their own perception of poverty.

Survey Area, Sample and Methodology

This article draws from a survey of forest people (the Bakas) and the descendants of the first generation of migrants in the rainforest (the Kakas), and a study of the Bamilekes' economic behaviour.

One hundred people were interviewed in the heart of the Congo Basin rainforest (South-Eastern Cameroon and North-Western Congo) and in the outskirts of the rainforest (Siembe and Lomie) in November and December 1993. The Eastern province covers an area of about 109,000 km^2, of which 76,300 km^2 is a forest area. One third of the Cameroon rainforest is located there.

Two main racial groups live in this province: the Bakas and the Bantus (which also includes the Kakas). The Eastern province is considered to be the poorest province in Cameroon in terms of natural resources and so, it follows, are the people living there. They have the lowest rate of literacy, the infrastructure is very limited and precarious. For example, there are only 80 kilometres of tarred roads in such a large area (Le Messager 1993:7), there are only two public high schools, and one public hospital of an average standard with one specialised surgeon for an estimated population of 478,200 inhabitants.

The Eastern province has the highest rate of infant and child mortality and malnutrition with 26.7% of children experiencing malnutrition (World Bank 1989). Less than 10% of the people have access to safe water (UNDP 1993). In spite of the poverty of both people and the province, the rate of deforestation due to agricultural activities is very low. The availability of potential arable land is the highest in the country, 22.1 km^2 per farm capita. Much of it, however, remains rainforest (World Bank 1989:10). Land used for agricultural purposes has been mainly cleared by farmers involved in cash crops, mainly robusta coffee. Robusta coffee is grown using extensive agriculture techniques which require extra land, and thus clearance of forest.

Non-probability sampling, mainly purposive and snowball samplings, were used to collect data (Russell 1988). A low population density and high mobility of the Bakas in a vast and dangerous area render probability sampling techniques

inoperational. Consequently, the data analysis is based upon qualitative rather than quantitative methods. Comparative analysis was also used to establish differences of groups' attitude towards the forest. This research was undertaken in the Congo Basin rainforest as a pioneering comparative study of three types of society: pristine traditional, communities in transition, and rural communities. Previous analyses have tried to study the link between poverty and the environment by using a static approach, as they tend to consider rural societies in isolation which are in an advanced stage of their transformation (Leonard et al. 1989; Mearns 1993).

My approach is rather a dynamic one. The history of people's behaviour and attitude towards the same or similar phenomena becomes the cornerstone of the methodology. It takes into its perspective changes, as societies and communities evolve. There are two advantages to this methodology. First, given the historical perspective, mechanisms behind the link are better understood. Secondly, underlying processes of change, and interactions taking place within the society can be unravelled.

Unlike other works whose analyses revolve around assessing local livelihoods in connection with environmental changes (Leach and Mearns 1992), our analysis places the central concern upon people's management of resources in relation to the depletion of the resource base. This analytical choice presents two assets: it gives a more complete picture of the use of natural resources at every stage of the evolution of a society, and it provides a greater flexibility for the study of interactions between local, national and international agendas and needs.

Poverty and Natural Resources Management: Comparing Groups' Attitudes

My survey of the agricultural practices of some rural people in the area found that the Kakas of the village of Siembe practice intercropping associated with tree planting. This has an advantage of providing people with the products they need for their subsistence (food and energy). Kakas also fallow land. Hence they combine both intensive and extensive agricultural practices. Kakas do not clear forest by bush fire, though they burn grass after clearing the land and before cultivation. Firewood, which is used for cooking meals, is mostly from dry trees felled during the clearance of the land to be cultivated, together with tree branches broken by strong winds. Unavailability of sophisticated devices, such as chain saws, makes it difficult for the Kakas to fell big trees or many trees at once. Kakas depend on herbs and barks for their health. In spite of some elements of "modern"

life, Kakas' daily life is still traditional, which explains their partial dependence on forest products.

The Bakas are the poorest of the poor both in this province and in Cameroon, by the classical or most other methods of poverty appraisal. By the classical measurement of poverty, they are below the poverty line since their annual income is US$0. By the basic needs model, their health needs are not met (UNICEF standard). Apart from those Bakas who have settled down within the framework of a project which aims at providing them with a sedentary lifestyle, the rate of child vaccination is nil. Bakas' rate of literacy and education is similarly nil. In 35 years only one Baka has managed to complete primary and secondary school. Bakas do not have access to safe water and they do not possess any belongings or houses; they live in temporary huts made of shrubs and leaves.

In spite of their state of deprivation, Bakas do not deforest. Of the Bakas interviewed, 85 % had never fallen a tree. The remaining 15 % felled young trees or average size trees, either to build their shelter or while working for a Bantu who was creating a farm. These 15% were either involved in a settlement project, or they were already living in a village following the Bantu lifestyle. In any case, those who felled trees were in the process of adopting a sedentary lifestyle with all its requirements. The 85% completely depend on the forest to meet their basic needs, food, health and shelter. Bakas do not consider the forest as a mere means or a source of their livelihood. Their perception of the forest is deeper: forest is their life. To answer the question *"why do you oppose the idea of clearing the forest?"*, the reply of almost all of them was *"because it is our life"*. Even those involved in the project of sedentary settlement gave the same reply. The reply *"forest is our life"* has two intertwined aspects which explain and summarise the Bakas' commitment to the forest. 'Forest is their life' support system and it is also their civilisation.

Another aspect of the relationship between poverty and environment can be examined by considering the behaviour of the Bamilekes in the Western Province of Cameroon. West Cameroon is said to have both the most fertile soils and the best infrastructure as far as roads, health, agricultural, water access and education are concerned.

Traditionally, rural people used to practise intercropping and in some places also agro-forestry. They produce enough food crops to meet their needs and the surplus is sold in other regions and cities. The West province is almost completely deforested. Rural people use part of their land to produce cash crops for local industries or for exports (World Bank 1989).

Between 1971 and 1986, Bamilekes increased their plantations and production of robusta coffee from 68% to 87% because of the international demand for this

variety of coffee (World Bank 1989). At the same time there was a stagnation in cultivation of arabica coffee, despite the high demand. This latter variety of coffee is suitable for highlands, yet less land is available. If there were more highlands covered with forests, further deforestation would have taken place. The West Cameroon case shows that the clearance of primary forest occurs for other reasons than those of meeting basic needs or tackling poverty.

Previous analyses in other developing countries have reached a similar conclusion. In the case of Brazil, the export of commercial crops or cow meat to supply food industry was portrayed as a major cause of deforestation (Gradwoll and Greenberg 1988). Côte d'Ivoire is said to have exhausted its primary rainforest both for political and economic reasons, including the payment of its external debt (Reed et al. 1988; George 1989).

Does Poverty Lead to Deforestation in Rural Areas?

The comparison with the Bakas, Kakas in the Eastern province, and Bamilekes in the Western province suggests a number of observations.

1. Despite people deprivation and the availability of land in the Eastern province, forest people (Bakas or Kakas) are not involved in activities leading to forest depletion.

2. People involved in cash or food crops for export or trade were influenced by a blood relative, government campaign, or the individual's education. These agricultural activities count for a significant part of forest depletion in rural areas.

3. Poverty at the regional and national levels was characterised by a lack of adequate infrastructure, and determined rural people’s behaviour towards the forest. For example, food crops produced by individuals in some villages in the Eastern province remain for a number of days alongside untarred roads, covered with dust or simply rotting because nobody buys them.

4. Access to technology and agricultural methods determines rural people's ability to deplete their environment. In some cases, the lack of technology is forest-protective. For example, the Kakas' rudimentary tools were an impediment to the clearance of larger forest areas. Poverty could, at times, be compatible with forest protection.

Measuring people poverty was and still is the first impediment to establishing the link between poverty and environmental depletion. The first difficulty is to determine the level of deprivation that makes the depletion of the environment inevitable. For classical analysts, the head count ratio provides the level. Below the poverty line of US$ 275 per annum, an individual is said to be poor (World Bank 1990), and becomes more likely to engage in deforesting activities. Basic needs analysts are less precise as they insist on the imperative of meeting the basic needs (WCED 1987; Wisner 1988; UNDP 1992). Universalist and regionalist views confront each other when it comes to determine the basic needs (Doyal and Gough 1992; Piachaud 1986). Development agencies have, however, agreed upon a core of needs which should be considered as the vital minimum: food, health and shelter. Failure to meet these needs at a minimum level could lead to forest depletion. The question is, what is the minimum level and who sets it? Recent works have placed emphasis on people's own assessment of their poverty through various methods including the participatory rural appraisal (PRA) (Chambers 1995).

The case studies of the link between poverty and deforestation in the Congo Basin rainforest highlight the findings. Bamilekes' case suggests that when the soil is fertile and there is food self-sufficiency, and when the earnings from food and cash crops are higher, rural people tend to deforest as well. Greed or aspirations for higher consumption (depending on how one views it), rather than poverty, leads to deforestation in this case. Moreover, Ekoko (1995) explains deforestation in Cameroon from a political economy perspective. Finally, Chambers (1995) argues that it is unlikely that the poor are the ones taking a short term view. Rather it is the outsiders – such as contractors who cut the forest, officials fixated on the financial year, and politicians who cannot see beyond the next election – who have a short time horizon.

Unravelling the Mechanisms of Poverty and Deforestation

The assumption that poverty at the individual level leads to environmental depletion appears to be too broad and not adequately substantiated (UNEP 1995). Individuals, poor or not, behave differently towards nature. The question is, what are the factors which determine their attitude and behaviour? Our fieldwork provides some early indications on the possible factors or conditions necessary to lead poor people to deforest. These are the existence of markets and high demand, changes in cultural values, development of infrastructure, inappropriate public policies and property rights. We examine each of these issues below.

Existence of Markets and High Demand

In a situation of low demand for products, people in rural areas tend to produce the quantity of crops which is necessary to meet their needs. Provided that population growth is low, extraction of natural resources (conversion of forest to farms for production, for crops or for building materials) will not increase significantly; this is the case of the Kakas and other groups living in remote villages of the Eastern province of Cameroon.

Markets should not, however, be confined to the monetary economy. Monetary, barter or subsistence economies could all lead to environmental depletion. In this case, the size of the market, mainly the magnitude of the demand, becomes the driving force of the pressure on the natural resource base.

There are examples of a subsistence economy leading to environmental depletion, a key element being the level of demand. This could happen when the demand of a product increases because a group of deprived people confined within a limited area need a given product for their survival. For example, the recent deforestation in Goma-Zaire is a result of a flow of a large number of refugees who were trying to meet their energy and food needs.

Changes in Cultural Values

Cultural changes observed during the past 50 years, and especially since the 1970s under the modernisation paradigm, have put traditional values, practices and beliefs into disarray. Pre-colonial traditional societies in forest areas had a human-cell philosophy. Humans were a component of nature, often seen as submitted to greater forces including the ancestors. The Douala people of the coastal forest managed to protect the Banya forest in the Littoral province for centuries despite people deprivation, simply by believing that the Banya forest was the dwelling place of their ancestors.

Change in values and urbanisation have recently led to the erosion of this cultural heritage. Lifestyle has also contributed to the preservation of forests. For example, a nomadic lifestyle characterised by permanently moving is associated with frugality and the absence of an accumulation process. Bakas take from nature the vital quantity of natural products to meet their needs. A shift from a subsistence society to consumerist societies is leading to the change in the pattern of consumption and in the very understanding of the notion of property and ownership. Where community used to have an upper hand in the management of resources, individuals are now reclaiming their individual rights. Where people's

livelihood depended on their immediate environment, alternatives are now offered with the negative consequences of implying that substitutes for nature exist. This is the case for a number of diseases which were cured traditionally by barks. The use of chemical drugs have rendered the existence of these trees meaningless, and thus they could be used for other purposes, such as biomass energy.

Communities which have preserved their traditional lifestyle and whose livelihood depend entirely (Bakas), or partly, (Kakas), on the forest tend to have an eco-centric view of the environment. On the contrary, those whose lifestyle have changed, such as the Bamilekes, tend to have a resourcist view.

Infrastructure Development

Good infrastructure is an asset for development (World Bank 1994). Infrastructure can both play a positive and negative role in the preservation of forests. The opening-up of roads enables new settlers, colonisers, loggers and poachers to move in and gain access to remote areas of forests (Hecht and Cockburn 1989). Infrastructure also facilitates exchange, trade and access to markets. Bamilekes' agricultural activities were stimulated because of the existence of a good infrastructure (roads) in the Western province; farmers could easily send their products to market places. In contrast, rural people in the Eastern province could not expand their agricultural activities, because of the lack of roads leading to the main markets in cities and abroad.

The above three factors interact. Omitting one of these factors affects the fragile relationship between poverty and deforestation. For instance, although there is a market for food crops in Bertoua and Nanga-Eboko, where people of Siembe could sell their products and consequently expand their farms, the lack of roads and viable means of transportation discourage them to increase their production by extending their farms.

Inappropriate Public Policies

Government policies, institutions and politics at the local, regional, national and international levels are other factors showing the link between poverty at the local level and forest depletion. These factors should be researched deeply and presented independently. Some indications, however, can be pinpointed.

Government forest policy, and more importantly the development strategies, are important elements of the mechanisms leading poor people to deforestation. In the case of Cameroon government policy, it appears that the philosophy underpinning

forest policy is the resourcist view of the forest. Forests are natural resources meant to be exploited for people's wellbeing and the Cameroon's economic development (Djingoer 1992). Forest policy will consequently be designed within this framework.

Development policies and strategies also play a major role since they determine the use of the natural resources by economic agents, including households, and the priorities of the government. Yet the land tenure system and the issue of property rights could well be two of the most important elements in the forest policy that have the greatest impact on the relationship between poverty and deforestation. Politics is another area of investigation which can give an idea of the power relations taking place at all levels, and how power struggles for their historical rights can lead people to deplete or to protect their environment (Ekoko 1995). This is our final topic.

Property Rights in Relation to Poverty and Deforestation

Early debates on the impact of the land tenure system on deforestation have resulted in a number of assumptions. Firstly, people's rights to land is vital for long term conservation strategies (Mearns 1993). Secondly, securing people's rights is conducive to a sound management of their resources (IFAD 1992). Thirdly, people's rights on land lead to good agricultural production (World Bank 1989). Yet few specific case studies have confirmed such a positive impact of rights and entitlements on forest conservation. Bakas, Kakas, Bamilekes and Makas present three different cases.

The Bakas have historical rights to the forest, as it is their dwelling place. The ordinances 1974/1, 1974/2 and 1974/3 of July 19 make the government the owner of the forest lands used by the Bakas. Depriving Bakas of the legal property rights has given way to an easy access to the South-Eastern Cameroon forest. If the Bakas had had the property rights of the land where these forests are located, deforestation would have not taken place. In this case, property rights combined with culture and lifestyle would be a useful instrument for forest conservation. The situation of the Kakas is similar to the Bakas.

Meanwhile the Bamilikes and the Makas offer counter examples. The 1974 ordinances, through retiring the principle of communal ownership, endorsed the move towards individual ownership. Bamilekes embraced the principle of individual ownership and individual property rights, and cleared forest to grow commercial crops.

Among the Makas, who live in the Eastern province, as well as the people of Lomie, communal ownership is common. Both communities have used their community property rights to sign contracts for forest exploitation with logging companies (Africa International No 263, 1993). Thus, property rights do not guarantee forest conservation.

The impact of property rights on the relationship between poverty and deforestation varies. Cases of the pristine traditional and of communities in transition show that property rights of both communities to their lands would have slowed down the rate of deforestation in the south-east Cameroon rainforest. Yet other communities' transformation to either individual property rights or common property rights have failed to use these rights to promote forest conservation.

Conclusion

Poverty does not necessarily lead to deforestation; this should logically be our conclusion. It would be, however, pretentious to extend the findings of a limited case study to a very broad field. Yet it is arguable that the link between poverty and deforestation should be established on a case-by-case basis. Our main contribution is the attempt to design a new analytical framework and to disentangle the mechanisms behind the supposed link between poverty and deforestation. Five linking factors were identified. All these factors are vital for modern or transitory societies. Globalisation and the dominance of the neo-liberal paradigm and modernisation ideas have, paradoxically, limited choices of lifestyle and policies. Idealistic paintings of traditional societies and the attempt to turn back the clock or to preserve Adam and Eve's garden are unrealistic. The real challenge could, therefore, be to find a balance *within* each of the five factors and *among all* of them.

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Notes

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Chapter 8

The CAMPFIRE Programme in Zimbabwe: An Approach to Environmental Conservation and Poverty Relief

L.T. Chitsike[1]

Introduction

This chapter presents one of the – unfortunately all too few – success stories of transfer of management responsibility and ownership of natural resources to local communities, and how wildlife conservation and increasing rural incomes can go hand in hand. In the 1980s the Government of the recently independent Zimbabwe was concerned with the problem of poaching in the communal lands. Faced with a decline in wildlife and difficulties in enforcing a ban on poaching, the Zimbabwean authorities decided to try a new approach to game protection. The programme "Communal Areas Management Programme for Indigenous Resources" (CAMPFIRE) was launched in 1988, with the support of many donors. The objective of CAMPFIRE was to encourage villagers to apply for an "Appropriate Authority" over wildlife to extract a sustainable economic surplus.

While CAMPFIRE is well known in environmental circles, its poverty alleviation aspects are less researched. This paper intends to fills that gap. It gives an historical background and describes the origins of CAMPFIRE (section 2), outlines the CAMPFIRE plan (section 3), and describes in the institutional arrangements surrounding the programme (section 4). The revenue- generating activities, mainly safari hunting, are discussed in section 5. Section 6 reports on how the local income generated by the programme has been spent. It is shown how CAMPFIRE has alleviated poverty by funding the creation or enlargement of schools, clinics, small-scale industry and roads as well as by distributing dividends to villagers. The section also evaluates the overall impact of CAMPFIRE. Section 7 gives suggestions for the way forward.

Historical Context

Zimbabwe, like many developing countries, has been struggling to identify and adopt a strategy and plans for sound conservation and rural development over the last 60 to 80 years. At the same time serious land degradation, high population growth and increasing poverty have become apparent to everybody.

Before colonial rule was introduced in 1890, there were no known cases of serious land degradation, threat to species, or poverty as is noticeable in modern times. At that time, the local communities and their leadership, operating mainly under a chieftancy system, owned all their natural resources and utilised them on a sustainable basis. Whenever there was evidence of over- use of medicinal herbs, grazing or over-hunting of a species, the chief issued a “decree” that was observed

by everybody, as it was clear the conservation measures were issued in the interest of the community as a whole.

The colonial administration declared all natural resources from the land, plant and animal species to belong to the Queen of England. Local communities were prohibited by law from owning or using them and violators were regarded as "poachers" and punished severely.

However, while the law prevented local people from utilising their natural resources, the incoming white settlers were granted wide latitude of usage with virtually no accompanying conservation or control measures. This occurred because first, hunting technology changed from the bow and arrow to the gun. Thus, large numbers of big game were lost and some reached threats of extinction as defined nowadays under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Secondly, the new colonial administration issued an ordinance that gave overriding powers to mineral prospectors and miners to cut down and utilise any wood they considered useful for mining. Similarly, when Virginia tobacco production was considered a viable agricultural venture, colonial ordinances also allowed large quantities of wood to be cut down for firewood to dry tobacco. Valuable forests therefore were cut down for mining and tobacco-growing purposes.

Because of the colonial and racial policies, local communities were moved from good agricultural areas to inferior ones with light soils, unreliable and low rainfall and high temperatures. Because the carrying capacity of these soils was low, an unprecedented rate of soil erosion ensued. Moreover, as it was impossible to eke out a living in the impoverished new settlements, local communities began to "invade" the prohibited national forests, plantations and wildlife parks. The "invasions" took different forms such as illegal cultivation, squatting, the cutting of fences and burning of the forests. Illegal hunting, or poaching, of wildlife started to occur at an increasing and uncontrollable rate despite arrests, prosecutions and fines.

The "Land Husbandry Act (1951)" tried to improve land conservation and increase agricultural productivity. However, having been drawn up by the colonial administration, it did not involve the local people and in its implementation was heavily top down, oppressive and commanding. The hostile and openly violent resistance to the Act led to the collapse of the programme. Since then, no comprehensive strategy had been considered for the communal lands even if 80% of the Zimbabwean population has lived there since independence in 1980.

The CAMPFIRE Plan

In the early 1980s after independence, staff in the Department of National Parks and Wildlife Management (National Parks) and other concerned parties wanted to redress the escalating problems of poaching in communal lands. They realised that no plan to stop poaching would work unless it rewarded the local communities in some--perhaps unconventional–ways. A plan was drawn from these premises.

The plan, named Communal Areas Management for Indigenous Resources (CAMPFIRE), targeted the poor and their environment in remote districts by encouraging them to take the responsibility to manage and conserve the natural resources in accordance with given guidelines. Altogether, over 26 of the 57 districts in the country had such potential.

The CAMPFIRE plan was consistent with the objectives of the national development plans by relating it to the paragraphs pointing to rural renewal based on communal issues and co-operative traditions in the management of common facilities and services. Legal institutions, social and economic aspects of communal lands were to be modified to provide a sound framework for the programme.

The CAMPFIRE programme now operates under the following principles:

i) All members of the community own resources in their areas, and thereby manage and benefit financially, economically, socially and culturally from them.

ii) The use of natural resources is controlled by the government.

iii) The land use system needs to accommodate agriculture, livestock, wildlife and settlements.

iv) The system needs to operate with the existing district, ward and village development committees.

v) Government, parastatals and non-governmental organisations will give technical support.

The Dynamics of CAMPFIRE

To begin implementing CAMPFIRE, a District Council needs to acquire an "Appropriate Authority", which is the legal term for the transfer of ownership and responsibility for wildlife management from the National Parks to a lower level.

With the "Appropriate Authority", the District Councils, and its wards and villages and their communities, became responsible for all other resources as well. However, the right to exploit forests has not yet been granted.

Awareness Campaigns

Due to the complexities of the CAMPFIRE concept itself, as well as the complex social economic and political issues particular to communal lands, it was necessary to embark on effective awareness campaigns throughout the villages and wards before trying to implement the programme. Consequently, a lot of time was spent to gaining confidence of councils and communities. This turned out to be a critical and a very successful exercise. Councils appointed a CAMPFIRE manager within their administration to work with the non-governmental organisation (NGO) promoters, and councillors themselves addressed several meetings in villages together with local chiefs and headmen.

Villagers did not trust the CAMPFIRE concept, as evidenced by some of their questions: "*Is CAMPFIRE not an attempt by government to extend the national parks into our lands as happened before when Hwange and other parks were established? How true or genuine is government in handing over management and financial benefits to us?"*

It took almost a year for CAMPFIRE promoters to introduce, discuss and satisfy local communities that they had a new and far-reaching approach to conservation and development in their areas using their own resources. Once the villagers and their ward leaders were satisfied, the project began in earnest and on a firm foundation.

Creation of Wildlife Committees

Under the District Council Act (1984) and Rural District Councils Act (1988), every district had an elected District Council, Ward Development Committees and Village Development Committees. The functions of these institutions were to enable villagers to identify and articulate their needs and to plan and implement development projects. However, due to a low level of education, weak institutional support and meagre financial resources, projects were poorly planned and implemented.

When CAMPFIRE was introduced and awareness campaigns completed, communities and district authorities seemed to have become aware of the inadequacies of the existing government institutions to support and sustain the

CAMPFIRE programme. The existing committees were weak in project planning, financial resources and administration and project implementation. Moreover, these committees were already loaded with other responsibilities such as collecting levies, gathering data for the central government, and settling local disputes.

Thus, separate wildlife committees were established to support CAMPFIRE programmes. However, the wildlife committees were to relate to the existing committees and government institutions. For example, the chair of the ward development committee co-ordinates with the wildlife committees and takes up wildlife issues to the district development committee level. The USAID gave the wildlife committees financial resources and soon the committees got funds from the CAMPFIRE activities as well. Some of the main contributors to the success of CAMPFIRE were surely the financial independence of the wildlife committees and their appropriate integration to the existing structures.

Training during and after awareness exposures for wildlife committees and villagers covered a number of areas, such as the role and duties for committees and their members, meeting techniques, recruitment of game scouts, relationships outside institutions (e.g. District Council and its wildlife and grazing committees, village and ward development committees, traditional leaders), the rights and responsibilities of members, and the participation of women.

As a result of the awareness campaign and subsequent training, the wards and villages became very active and lively, and went straight into development issues of great concern to them. Three examples highlight the dynamics of CAMPFIRE. In Madhambudzi Ward, the wildlife committee wished to see CAMPFIRE benefits extended to timber and other resources in their ward. Soon they realised that the District Council was selling high quality Mukwa hardwood from their ward to sawmills without passing any revenue down to the villages. In Bambadzi Ward (Plumtree), the wildlife committee began challenging the council to justify its stated wildlife management costs. Soon after training, Hawana Ward (Plumtree) embarked on plans to establish a grazing scheme, ostrich egg collection and irrigation farming.

Some wildlife committees faced problems. Firstly, some ineffective government village and ward committees feared that the new wildlife committees would directly usurp their powers, authority and influence, since they were economically more powerful and better technically supported from outside. Secondly, the District Councils saw the vocal and quizzing ward and village committees as knowing too much about CAMPFIRE, and at the same time asserting their rights in terms of project development, financial benefits and

administrative systems based on democratic principles that require consultations upwards and downwards. For these reasons, the district authorities became very suspicious and resentful to wildlife committees and CAMPFIRE itself.

However, with time and after seeing the benefits of CAMPFIRE, the District Councils have become more receptive to empowerment. Now the district CAMPFIRE manager is appointed by council works and works well with the NGO support staff. The Councils pass down to the wildlife committee CAMPFIRE revenues as outlined in the plans. They also agree not to interfere with the use of the funds at the ward and village level.

All CAMPFIRE wards are responsible for their own development planning activities, which are discussed at ward general meetings and approved there before implementation. However, due to illiteracy and the low level of education, wards have difficulty drawing and implementing some of their plans on their own. Thus, good working relations with government departments, parastatals and NGOs are of great help.

The District Councils feel that a lot of people who had resisted CAMPFIRE at its inception are now envying for posts within the CAMPFIRE wildlife committees. Even the local politicians, the councillors or members of Parliament are using CAMPFIRE as a way of gaining popularity and votes for council elections. In summary, CAMPFIRE institutional development is making good progress on many fronts, the committees are democratically elected and are effective, and decisions are being made by the communities themselves. However, skills in book keeping and accounting, and project planning and management still require input from supporting agencies. Women is involvement in decision-making is growing but not yet adequate.

Support Agencies

The districts under the programme receive technical support from the government, NGOs and the University of Zimbabwe. These organisations meet regularly to co-ordinate their support services as an agency known as the CAMPFIRE Collaborative Group (CCG). There are six main supporting agencies:

i) The Department of National Parks and Wildlife Management administers the Wildlife Act (1975) (1982) and provides all basic information on wildlife matters. It also trains game guards, assists in problem-animal issues and approves and monitors quotas for safari hunting.

ii) Multi-Species Project of the World Wildlife Fund (WWF) analyses the economic and ecological consequences of cattle and wildlife production

under different land tenure systems. It also assists producer communities in ecological wildlife management.

iii) Centre for Applied Social Science in the University of Zimbabwe carries out socio-economic research as well as institutional and policy analysis on CAMPFIRE. It has conducted baseline studies and is involved in the monitoring and evaluation of CAMPFIRE programmes in several districts.

iv) Zimbabwe Trust is an NGO supporting CAMPFIRE programmes in several districts through awareness and training programmes of village committees up to the District Council. Earlier it was helping in the infrastructure projects, but it has handed over much of this responsibility to other agencies, including the District Councils themselves.

v) Africa Resources Trust (ART) provides a link between CAMPFIRE committees and support agencies and other countries. ART promotes the CAMPFIRE concept to other African countries as well as the learning of other similar initiatives and policies in other parts of Africa and the rest of the world.[2]

vi) The CAMPFIRE Association is a national body made up of all district councils under CAMPFIRE. It passes information from government, ART and other sources to regions and districts. It organises educational visits within and outside the country for their members.

It is envisaged that other government ministries and parastatals will take an interest and give more technical support to local communities especially as they enter the phase where they raise more revenue and engage in more complex projects.

Collaboration with Government Institutions

From the very beginning, the CAMPFIRE promoters realised that it was essential to develop good working relations with key institutions relevant to the programme. Government institutions were obviously crucial, as they could provide technical services outside the scope of CAMPFIRE support agencies. In addition, it was important to be in touch with policy- related institutions like Provincial Administrators and the National Planning Agency offices in the regions. Some of the most important links are outlined below.

An official contact was established with the Provincial Co-operative and Community Development officers to secure support for the women's officers. They could then work with the Ministry's Ward Community Co-ordinator and

the Village Community Workers. Through that linkage the women's officers were able to conduct successful training sessions on needs analysis and other activities. CAMPFIRE promoters contacted the Ministry of Education to reinforce the planned efforts to introduce conservation education in schools. The Ministry identified District Education Officers as the appropriate persons for consultation.

A vital link was created with Agritex whose technical input was rendered in several districts. Notably, the section responsible for topography and conservation assisted in the production of maps for the producing areas and the insertion of projects on maps. Agritex also assisted by providing aerial survey profiles and provided physical input in determining sites for water projects.

The provincial promotion and training officers of the Ministry of Local Government helped in arranging the initial training of council executive officers and NGO staff with management development programmes. The Ministry of Public Service assisted in arranging courses for Zimbabwe Trust staff on "Training of Trainers".

Finally, meetings with the National Planning Commission and Provincial Administrators resulted in a workshop to brief provincial leaders on CAMPFIRE. As a result of giving basic information to the National Planning Commission, CAMPFIRE was included in the Five Year Development Plan.

Examples of CAMPFIRE Activities

The CAMPFIRE programme has evolved from a concept to various activities. Some of the crucial ones are the strengthening of the capacity of the villagers to negotiate with the safari operators, the training of game scouts, infrastructure development and increased community knowledge of natural resources.

Making Contracts with Safari Operators

District Councils did not have any skills or experience in safari hunting business. The National Parks and Zimbabwe Trust assist District Councils with general information, strategies and tactics of handling the contracts. The wards and villages demand from their Council to be involved. However, local communities are trained and participate in quota-setting for each species of wildlife before hunting begins. Most communities make accurate estimates which are approved and endorsed by the National Parks.

Game Scouts to Control Hunting

CAMPFIRE committees select game scout candidates for training with the National Parks for a one-week period repeatable over several months until the scouts are familiar with their functions. USAID supports the training of game scouts who go to special training centres in the country. Game guards assist local authorities by supplying information on conservation activities and situations to village and ward wildlife committees, assist and monitor the safari hunters, assist National Parks and District Councils on Problem Animal Control matters, and participate in other activities related to wildlife management.

Water Projects for the Survival of Wildlife

District Councils and Zimbabwe Trust have assisted ward and village communities with water projects that are vital for the survival of wildlife, livestock and human beings. CAMPFIRE support agencies assisted in repairing the Maitengwe and Masi dams (Bulalima Mangwe) to increase the water holding capacity. A wide variety of animals are attracted to Maitengwe dam, as it is the centre of wildlife, including birds and fish. It is anticipated that a photographic safari project will start soon. In many other CAMPFIRE districts watering pans and boreholes were drilled.

In Binga District, the most impressive infrastructure developments are the solar electric fence blocks between 14 to 24 km in circumference, constructed by ward members, National Parks and the District Council. The fences protect the community crops and residential areas from wildlife. The local community maintains the fences well through trained fence monitors.

Increasing Community Knowledge of Natural Resources

In a survey of CAMPFIRE-held in districts with at least three years of CAMPFIRE, over 96% of members were articulate regarding basic natural resources knowledge, while the share was very low in districts and wards without CAMPFIRE. The people in CAMPFIRE programme areas also fully understood that wildlife conservation and rural development are intimately related to resources, beginning from the soil, grass, trees and wildlife: hence the capacity to distinguish resources that can be exploited in a sustainable way (Chitsike et al. 1994).

Consequently, communities under the CAMPFIRE projects are now very resource-conscious and have achieved the following:

i) Random tree cutting has ceased or has been drastically reduced. A resident only cuts trees for a good reason and in a manner that is conservation-friendly.

ii) Bush fire burning has drastically dropped. Communities voluntarily rush to put out fires if they occur.

iii) Earth dams are being built with community capital and labour resources to conserve run-off water.

iv) Sledge transport, which causes soil erosion, is effectively banned.

v) Conservation committees established in villages are effective and often operate with by-law backing.

vi) There is an increasing number of cases of planned paddocks to conserve grass and improve pasture.

vii) There are game scouts everywhere, monitoring wildlife populations and poaching.

viii) Due to the elimination of poaching, wildlife populations are increasing.

Income Generation

For CAMPFIRE to succeed it needed to create income for local communities as well as revenue to cover management costs and overheads, including a levy to the District Council. Therefore, CAMPFIRE was planned to allow each community to be free to choose options for the basic income generation that best suited it. With wildlife as a form of land-use, a management programme was designed which included international safari hunting, Zimbabwe recreational hunting, sustainable cropping to produce meat and hides, sale of live animals, crocodile or ostrich farming, secondary industries and ecotourism.

Safari Hunting

Safari hunting appeared to be the most lucrative because it could be implemented with minimum development costs. It requires only the leasing of hunting rights to an operator who takes on the full responsibility of finding clients, accompanying them with a professional hunter, providing accommodation and other logistic arrangements. The community acquires income from the sale of trophy licenses and the lease of hunting areas. To date, international safari hunting is the main source of revenue for CAMPFIRE districts; it accounts for 90% of total revenue of which 64% is elephant trophy hunting.[3]

Principles Applied in Marketing Safaris

The three guiding principles of CAMPFIRE programmes are competition, transparency and participation. The best way to increase earnings from wildlife is competitive marketing. This more than doubled the earnings from wildlife over the first four years.

To avoid the risk and suspicion of corruption, marketing should be done openly. Transparency is increased by following tender procedure, ensuring that the selection panel is reasonably large, allowing community members to observe the process and inviting outside observers in government (who should not vote).

Members of the marketing and select committees or panel must represent producer communities. A control principle of CAMPFIRE is that decision-makers must be fully accountable to the people they represent, and should not undertake activities such as marketing without proper consultation and involvement by the local communities.

Organisation of Safari Hunting Business

The key business agent in safari hunting is the safari operator who enters into concession contracts with a District Council. Each concession usually covers a five year period and has an annual quota which is approved by the National Parks. In broad terms, there are two kinds of hunting, the big hunt lasting at least ten days which include game, like elephants, lions, leopards and buffaloes as well as plains game for which the client pays US$ 700-1,000 per day. The second is plains game hunting lasting up to 10 days, if four larger animals (kudu, wildebeest and zebra) and several smaller animals (such as impala, duiker and warthog) are available, costing US$400 per day.

Clients, who are accompanied by a professional hunter, come mainly from the US, Germany, Spain and other European countries. In addition to the daily rate, the

hunters pay a trophy fee for each animal shot ranging from US$75 for impala, US$2,000 for sable, to US$10,000 for an elephant. Thus, an elephant hunt will cost the client approximately US$30,000. The trophy fees, which are usually about a third of the total price, accrue to landlords, that is, the District Council and its communities. The operators retain the remainder as payment for their services and cover operational and capital costs, which are often quite high.

Sustainability of Trophy Elephants and Other Species

Before CAMPFIRE was introduced, about 50 elephant bulls were shot as trophies and a further 200 to 300 were shot annually to protect crops or lives. Hoare (1993) confirmed that 87% of animal problems consisting of crops damage, threats to humans and livestock destruction were caused by elephants. Now that elephants are worth so much to communities (US$10,000 each) and because of the need for low off-take rates to maintain trophy quality, they are used cautiously. Altogether, of a total elephant population of about 60,000, only 120 elephant bulls are killed each year with less than 30 now shot as problem animals (Child 1995). Thus, by encouraging well-planned utilisation, the number of elephants which are shot has been more than halved.

Species	Annual rate of increase	Maximum off-take
Elephant	5%	0.75%
Buffalo	10%	2%
Duiker	20%	15%
Lion (male)	5%	2%
Bushbuck	10%	3%
Leopard	15%	8%
Kudu	10%	1.5%

Table 8.1: Estimated rates of increase and off-take rates for species in safari hunting, share of total population

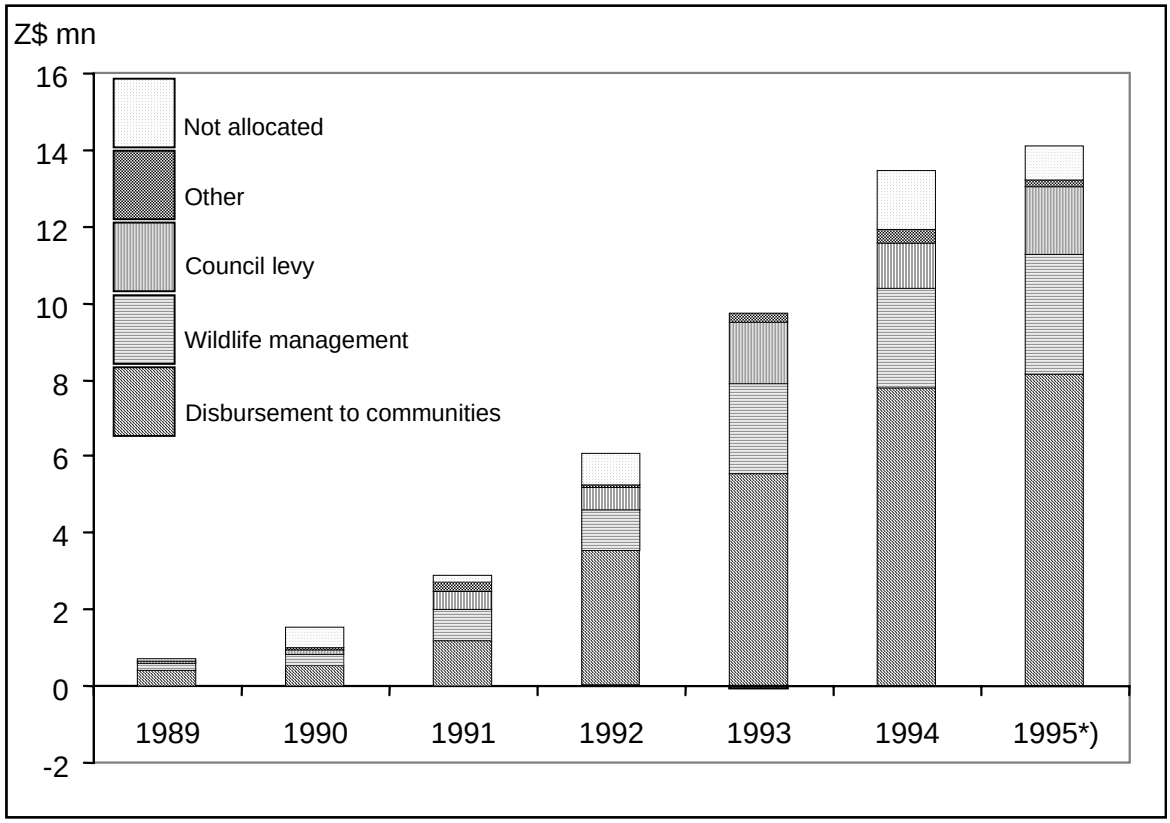
Source: Child (1995)

Through the CAMPFIRE programme, off-take rates have been reduced to less than 1% of the elephant population (Table 8.1). This is sustainable for adult males, and the annual population growth of elephants is more than 5%, using a specific formula developed by Western (1989) and Cuaghley and Krebb (1993) to determine the sustainability levels of animal population.

Income Generated by CAMPFIRE

The value of wildlife on quota in Communal Lands sold by District Councils increased from Z$2 million to Z$3.5 million between 1990 and 1993 as the National parks increased their quota. Together with the improved marketing of safari hunting driving up revenue, the income received by poor communities from CAMPFIRE activities has increased from Z$0.4 million (US$0.2) to Z$8.1 million (US$0.9) between 1989 and 1995 (Figure 8.1), Increases in the quota and the depreciation of the Zimbabwe dollar explain partly this increase, but also the income share of poor communities rose from 53% to 58% during the same period.

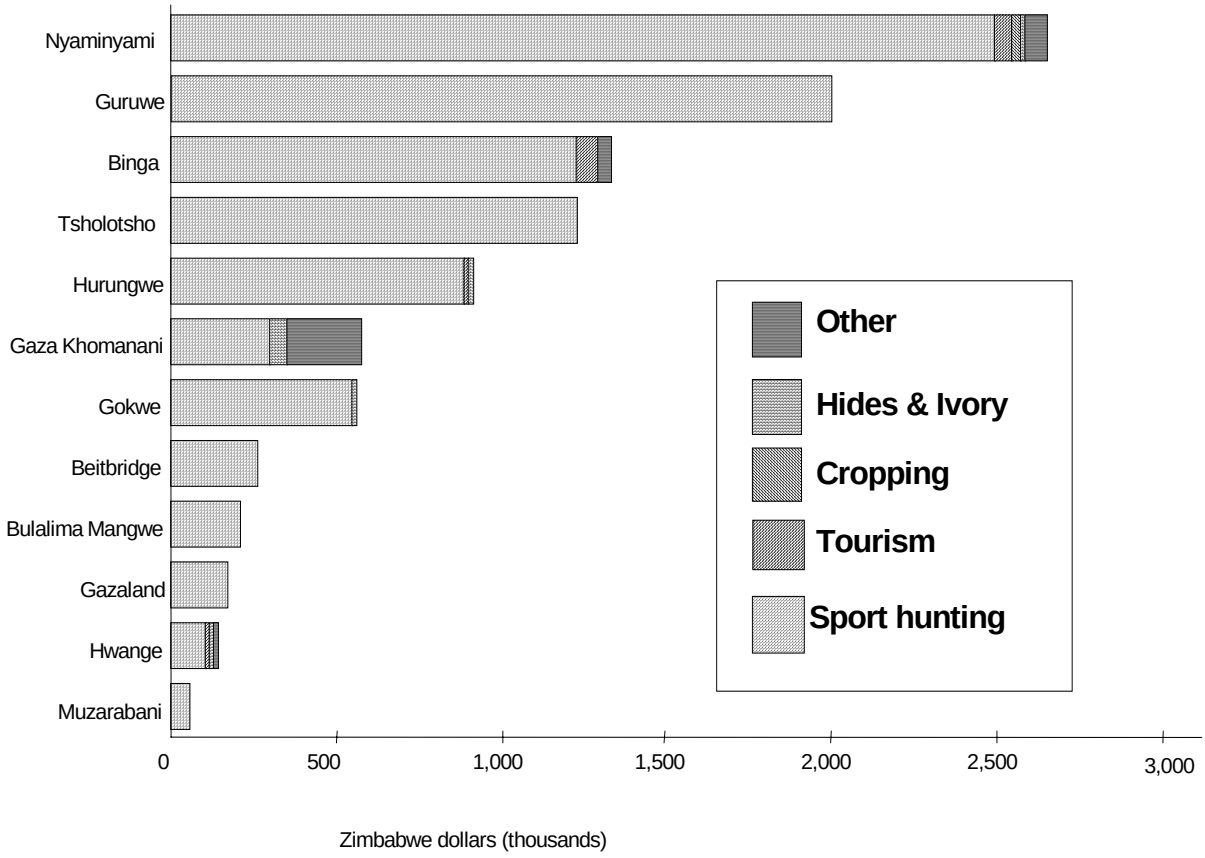
Figure 8.1: Use of CAMPFIRE revenue 1989-1995



*) Provisional. Does not include income from Gokwe South and Mudzi Rural District Councils.
Source: WWF Programme Office. Harare. Zimbabwe

For instance, elephants licenses were originally sold for Z$10,000 but the same license earned Z$50,000 in 1994. Even if much of this increase has resulted from the devaluation of the Zimbabwe dollar, improved marketing – mainly by generating increased competition between operators – has doubled the revenue earned from each animal. This doubling coincided with a significant effort, especially because the National Parks and WWF assisted the District Councils in enhancing their marketing skills and increasing their bargaining power. Thus, tenders push up prices and interviews push them even further up. Competitive marketing has replaced a system whereby government set the prices of each species.

Figure 8.2: Distribution of CAMPFIRE Income in Districts, 1994



CAMPFIRE activities have generated most of the income in the Nyaminyami, Guruwe, Binga, Tsholotsho and Hurungwe districts (Figure 8.2). It is noteworthy that these are among the poorest areas in Zimbabwe.

Most councils get approximately 30% of the gross income earned by the safari operator, with some earning 40%. Competitive marketing has reduced operators' margins from 25% to 5-10% of gross income.

Between 1989 and 1993, the number of households benefiting from CAMPFIRE increased from 500 to over 70,000 and the number of wards benefiting has increased tremendously. Cash dividends increased from an average of Z$90 in 1989 to about Z$160 in 1993 (Bond 1994). However, even if dividends are used, most districts have used a growing share of CAMPFIRE income to fund community projects such as schools, clinics and income-generating projects like grinding mills.

Various forms of employment are associated with CAMPFIRE and safari activities. Trackers, skinners and camp attendants are recruited by the safari mainly from communities in wards where CAMPFIRE projects are running. Where experience is not available, safari operators train the local staff from scratch. For example, Matupula Safari pays over Z$18,000 annually, mostly in the form of wages paid directly to families.

Whenever possible, safari companies purchase items they need to build and run camps from their neighbours. Items such as thatch grass, reeds, mats, strings, camp decoration and eggs, are bought from local women. The result is a steady flow of cash from the camp points to the local economy.

In addition, where game bait is scarce and meat a luxury, bait hunting is a wasteful use of the wildlife resources. Consequently, safari operators encourage their clients to purchase old cows, donkeys, and goats for leopard and lion baits. An old donkey of only minimal value can thereby be turned into a source of cash for local people. Safari clients also spend money on curios and mementoes on their visits. Whilst some take their clients to town, some organize sales at the camp and each client spends about Z$500. Safari operators also donate valuable items, including paints and roofs for schools, and a lorry.

Emerging CAMPFIRE activities

The CAMPFIRE programme has moved towards new activities to improve the livelihoods in the rural areas. The ostrich industry and women's projects are examples of such new activities.

CAMPFIRE districts could also benefit from the ostrich industry, which is well established in the country. Today there are 250 ostrich farms holding more than 300 hens, 200 cocks, 8,000 juveniles and more than 15,000 chicken (Mundy 1996). CAMPFIRE districts have shown interest in the industry due to the high prices of the products, with each ostrich ranging from Z$10,000 to $15,000, and an egg selling for Z$10 or more.

Mudzi Rural District Council was the first district to start an ostrich project. Beitbridge and Chiredzi wish to do the same. Mudzi has laid out a project worth Z$17.5 million, borrowed from the Agricultural Finance Corporation. Paddocks are arranged for growers and breeders. Some of the birds are ready for both local and export markets, and there are plans to establish a butchery and abattoir as other such farms have done.

Various surveys have been conducted to identify women's projects and markets under the CAMPFIRE programme. Although the surveys demonstrated vast and

varied potential, until now not much has been achieved in this field. The ones that had the greatest potential were mopane worms and handicrafts.

Mopane worms are said to be a very popular delicacy and rich in protein. They have great potential as money makers for local communities and especially for women. Under the CAMPFIRE programme, mopane trees are well conserved. Local women who harvest and process the worms are however, exploited by middlemen and transport owners who manage to buy these at low prices and resell in distant markets in Zambia, Botswana and South Africa. Funds are being sought to assist women to establish worm processing as a viable business. In trying to do so research is being conducted to determine ecological sustainability, market value and supply of the product. The processing plant would assist in the preservation, packaging and pricing of the product. The women's groups should be able to sell to either wholesalers or directly into the retail market. The districts in the Western parts of Zimbabwe are most active in this business.

There are numerous handicraft producers who are keen to undertake serious handicraft business singly and in groups associated with or outside CAMPFIRE. The craft range includes ilala and sisal basketry and wood carvings. The quality of product is already good for a wide range of the products, mainly produced by women.

There are local buying agencies such as Jairo's Jiri, based in large towns and international organisations like the National Handicraft Centre. International business is conducted through trade fairs held in Germany, the UK, Canada and Australia. Some NGOs give technical support for management, especially to women, with big business in basketry and crotchety. Binga is well known for its basketry and financial viability. In 1990, the Binga craft centre paid Z$100,000 to Kariamwe basket weavers. There is still scope for expansion with improved market research, product improvement, and more capital for poor weavers, especially women. There is also a project for the ecological sustainability of the species of grass used for weaving in Binga.

Impact of CAMPFIRE on poverty

Use of the Generated Income

Most, if not all, of CAMPFIRE activities are in poor areas even by Zimbabwean standards. Thus, the additional revenue that the villagers receive helps them to decrease the incidence of poverty and to raise their living standards. Approximately 70% of CAMPFIRE revenue has been distributed at the ward

level and in 1995, 80% of revenues went to the communities, giving an additional per capita income of Z$15 per person (or Z$71 per household). Obviously, the income varies in different parts of the district, according to hunting quotas for different wards and villages. While the income generated by CAMPFIRE activities is unlikely to raise all poor people from poverty, such income is a welcome boost to the living standards without disturbing the ecological balance.

But how do the people use the additional income generated by CAMPFIRE? A case study of Binga district (Funder 1995) sheds some light on this. In Binga district, CAMPFIRE activities generated significant revenue primarily through hunting safaris. The income thus generated has grown steadily from Z$0.2 million in 1991 to Z$1.7 million in 1995 (Funder 1995), confirming wildlife is a viable land use option in dry regions.

It is noteworthy that almost half of all the funds generated by CAMPFIRE went to school improvement (Table 8.2). A fifth of the funds were saved and a tenth were given as dividends. Surprisingly small amounts were spent on health care. It is not known what the basic situation in the villages was, in particular in schools and health facilities. However, the above figures suggest that – given a free collective choice – the villages are willing to invest large amounts of their income in education. Finally, it is noteworthy that nine percent of the income was “not accounted for”. Even though the figure is not high, the fact that such a figure was reported indicates that CAMPFIRE is operating in a transparent way. An important aim should, nevertheless, be to reduce this percentage.

Type of expenditure	**Share of expenditure (%)**
School development	41
Banked money	21
Household dividends	12
Mill operation	4
Administration	4
Fence maintenance	2
Shops	2
Clinic development	2
Other projects	3
Not accounted for	9
Total	**100**

Table 8.2: CAMPFIRE expenditure in eight wards[4], Binga district 1991-94
Source: Funder (1995: 2)

Overall Impact on Local Communities

The CAMPFIRE programme reduces poverty by generating and distributing income, by distributing socio-economic benefits, by creating employment and by increasing ownership and decision-making power at the grass roots level.

Today, CAMPFIRE activities generate annually over Z$13 per capita in remote and very poor districts which previously had no means of raising development funds. These funds are devolved from districts to wards and their villages for community projects and household dividends, bringing financial benefits to each and every household. Where dividends are high (over Z$200) they have an impact on families that have no other source of cash.

The major socio-economic benefits leading to improved living standards include school and clinic improvements, fence installations, shop and grinding meal projects.

Several jobs are created through the safari operators' activities, including trackers camp attendants and skinners from the communities. The safari operators buy grass and reed mats from local producers. A total of 20-30 temporary jobs per village are generated through fence and building activities.

Indirectly, school improvements lead to employment creation as educated youth qualify for semi-skilled jobs in town and commercial farms.

CAMPFIRE has had a major impact in increasing the control, decision making and empowerment of local communities in Zimbabwe. This development is very important to the poor, deprived communities. Local people decide for themselves to fight their own poverty problems using the resources at their disposal. The "appropriate authority" they receive from government is the major legal instrument for such empowerment. The transparency in the selection of committee members and at general meetings are instruments of control and decision- making by local communities, although the system is not perfect for women and very poor people.

Despite all the success achieved under CAMPFIRE, poverty is still an important issue in Zimbabwe. Still, CAMPFIRE has demonstrated that it is possible to improve the living standards of very poor remote communities using local resources on a sustainable basis.

The Way Forward

A primary and urgent objective in the future must be a considerable improvement in the economic returns of CAMPFIRE in all of the districts. There are wards without wildlife which cannot continue to be left out in the current development process. Other resources like timber, fishing and ecotourism need to be tapped for community development.

This means the district and community leadership needs to have vision and entrepreneurship for income-generating activities. A chairman with vision plans ahead, uses his contacts with government, NGOs, and the influential private sector to acquire additional developmental resources for his district. The village leaders must know their resources and potential for development and encourage all members of the community to be innovative and development conscious.

The devolution of project planning and implementation to the local level is an important issue in CAMPFIRE. Apart from formally allowing villagers to have influence on the types of project they prefer, there is also an important element of learning by being involved. But this does not mean communities do not need outside assistance, especially when the villages are to embark on projects that have a meaningful impact on their standard of living.

Without greater control of wildlife resources at the local level, the danger is that community participation in CAMPFIRE will appear to be instrumental for wildlife conservation, rather than for the genuine development of the community. This means greater representation within bodies administering wildlife and other natural resources in the area. For instance, plans are under consideration for the creation of a Board of Management for the Chizarira National Park, and another new park in the Rushinga district, as well as one on the Lake Kariba Shore.

In addition, communities would like to be more involved in the activities of the Safari operator as co-managers, learners, and even as shareholders in ecotourism enterprises.

Too many decisions and activities are handled at the ward levels where committee management is great compared to village-level decisions, where it is to call more meetings as people live nearby. It is also important to organise more awareness and confidence-building courses and workshops to encourage more women and very poor people to feel free to talk at public meetings and campaign or be ready to accept nominations into committees.

Whilst communities were happy to see the natural resource component of CAMPFIRE grow and develop in a sound manner, they also noticed that a system of whole district, ward or village development plans are not in place. There is no strategy and proper training that takes care of the projects that are spin-off from CAMPFIRE revenue, and as a result most of the projects for instance, grinding mills, shops, irrigation and bakery projects, run into serious financial and management problems.

In most CAMPFIRE districts in the dry regions, a possible strategy could be built on three basic assumptions: that wildlife is the basis to rural development (like agriculture in wetter areas), that the development of wildlife requires the concomitant development of secondary and tertiary sectors, and that social forces play an important role in wildlife development.

Although the CAMPFIRE programme has in many respects successfully been able to marry the objectives of environmental conservation and poverty reduction, the programme is constantly facing new challenges. All parties involved must seek to continuously improve the programme and be faithful to the original CAMPFIRE idea: the local people should own and control the resources, and get the lion’s share of the income generated.

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Notes

[1] I would like to thank Matti Vainio and Arild Angelsen for many useful suggestions in revising this paper.

[2] At present, part of the revenues from trophy hunting now go to local communities only in Tanzania, Namibia and Zimbabwe (Dublin et al 1997).

[3] Perhaps contrary to the popular belief, most elephants do not live in national parks but remain mainly outside. It is estimated that African elephants spend about 80% of their time outside the official protected areas (Dublin et al 1997).

[4] The wards were Kabuba, Nabusenga, Tyunga, Nagangala, Lubu, Sianzyundu, Muchesu, and Sinansenwe.

Chapter 9

Summary and Conclusions: Lessons Learned

Arild Angelsen and Matti Vainio

Some 60 % of the world's poorest people live in ecologically vulnerable areas, a figure which suggests a strong correlation between poverty and environmental degradation. The studies in this book give empirical evidence on the causalities of the link between poverty and the environment. Below we summarize and extend the main lessons to be learned. We conclude by postulating that poverty and environmental degradation could appropriately be seen as the joint consequence of the same processes, rather than one causing the other.

Lesson 1. Traditional Uses are Often Sustainable

The case studies show that traditional uses of the environment have often maintained a sound balance between people's short-term needs and the maintenance of the ecosystem's long-term health, and thereby its ability to satisfy the people's long-term needs. However, as briefly discussed in the introductory chapter, there is some controversy regarding how to explain this: is it the outcome simply of low demand due to low population densities, limited access to markets, and the lack of means to overexploit the environment? Or, is it the result of moral systems and institutions, which have evolved to ensure a sustainable management of the resources?

This balance can be interrupted in several ways. In some cases, population growth will increase the pressure on resources (population-driven degradation). In others, new market opportunities (better access, price increases, or market integration of the local economy) may lead to overexploitation of certain resources (market-driven degradation). Yet another possibility is when local communities lose control over the resources (conflict-driven degradation).

In situations with low population densities and no external users, it is less important who has the property rights. If resources are abundant, the value of establishing and enforcing property rights (individually or collectively) is small. This was evidenced in Ekoko's article of Bakas in the Congo rain forest. In effect, they were so few in number that they could not overuse their environment. Still, it was evident that they felt that they own the forest and did not want to harm it. The main response to the question *"why do you oppose the idea of clearing the forest?"*, was *"because it is our life"*. If no outsiders would come to their residential areas, Bakas would unlikely start destroying their livelihood. The risk for environmental degradation is not coming from the Bakas, but from the outside world.

In areas with low population densities, shifting cultivation methods can be sustainable. However, if land use intensity increases, for instance because of in-migration or plantation projects, shifting cultivation methods add to the environmental burden. If the government encourages in-migration through resettlement programmes or subsidies, such as granting land and/or providing irrigation water free of charge, the resource use intensity rises quickly. In addition, if the government gives logging concessions without taking into consideration the negative impact of logging on the watershed and rivers, it gives an implicit subsidy to unsustainable development in the area. Valencia showed in her article that these elements seemed unfortunately to be prevalent in the use of natural resources in the area that the Bugkalots claimed as their ancestral land in the Philippines.

Nuraain and Yaakub Johari showed that in Malaysia the tension between shifting cultivators and the government is similar to that of the Bugkalots. The government required that the land claim be made only if the applicant could show that she or he had occupied the land continuously for three years. This is not possible in shifting cultivation and the conflict remains to be settled in the future. Moreover, Nuraain and Yaakub Johari noted that the shifting cultivation methods used by *Orang Asli* people in Malaysia were far less damaging to the environment than the large scale agriculture and other development projects.

The above should not be taken as a blanket plea for encouraging shifting cultivation. It should still be noted that poor, "primitive and ignorant" farmers often become convenient scapegoats for governments in the process of allocating the responsibilities for environmental degradation. The image of the poor shifting cultivators to be the culprits of loss of forests in the world is a popular, but sad, misconception.

Lesson 2. Poverty and Environmental Degradation Affect Women and Men Differently

In India, where the population densities are very high, Nagla showed that it really matters who controls the use of land, forest and waters. Using gender analysis as his point of departure, he showed that poverty within the household is too often borne by women and girls. The environmental degradation falls disproportionately on women, but they are seldom the ones that have initiated the destruction, be it in building dams, industries or irrigation schemes. It is women and their daughters who have to walk longer distances to fetch fuel wood or water if their environment is degraded.

One obvious insight to be drawn from the study is to be particularly attentive to the intra-household decision-making system when developmental activities are planned. It is not enough to make a general Environmental Impact Analysis; it should be complemented by an analysis of the impacts upon men and women. This would not only safeguard the rights of the more vulnerable parts of the population, but using women as a resource in planning activities would also give new insights on how development could come about.

Women have played an important role in the environmental movements in India, such as Chipko and Narmada. These movements have inspired the growth of similar other movements, generating a far-reaching debate concerning the direction of economic development in India. This is illustrated well by a woman's comment to a forest official: *"For you trees are deadwood, for us they are living things. They are like our limbs, each time one is cut, our chances of survival are cut."*

Lesson 3. External Resource Appropriation and Loss of Local Entitlements Triggers off Poverty and Weaken or Destroy Local Management Systems

The main story in a large number of case studies, the ones included in this book, is about local communities losing rights over resources which they traditionally have controlled, starting a process of both resource and entitlement degradation. The popular debate often focuses on vicious circles related to the degradation of physical or biological resources. An important conclusion deriving from case studies is that the loss of entitlements may be equally or even more important, as discussed in the introductory chapter.

Such external resource appropriation and loss or degradation of local entitlements will obviously have a negative effect on local people's welfare, both directly and indirectly, by initiating a process of resource degradation. The latter will come from different sources. First, the overall resource use is likely to increase. Second, the local incentives for resource conservation will decrease, and the resource utilization will move in the direction of an open- access regime.

The poor are suffering from environmental degradation, in particular, when outside users exploit the poor's environment to their detriment. Nuraain and Johari illustrated, for example, how artisanal fisherfolks in the coasts of Sabah, Malaysia were suffering from the overuse of coastal fishing resources. This was

one of the main factors in the persistence and increase in their poverty. The main reasons for the deterioration in fishing stocks were (i) overfishing by commercial trawler boats, (ii) harmful fishing techniques, in particular fish bombing, practiced mainly by the illegal migrant population, and (iii) the deterioration and destruction of mangroves and other coastal resources. The local artisanal fisherfolks were mainly suffering from the deterioration of the fisheries without having the means to counter the preying of commercial trawlers or illegal immigrants. Also Ekoko showed in the study from the Cameroon rain forest that deforestation did not usually emerge from the local population. The pull from the outside, and the pull from the markets in particular, was crucial.

The Cameroon study also demonstrates how conflicting land claims in combination with new market opportunities can lead to deforestation. As the coffee prices, which are obviously determined outside the local market, were booming, the Bamilike tribe in Western Cameroon started to clear forest for coffee cultivation at an accelerating rate. The primary reason for clearance was not poverty, as the Bamilikes are relatively well off.

The Bamilikes had secured individual property rights over their land. Still, they cleared the forest for coffee production. It seems that the short-run profits from coffee production outweighed the profits from long-term forest cultivation. This indicates that 'deforestation' is not necessarily a bad occurrence. If the activity that replaces the natural forest cover is more profitable and simultaneously environmentally sustainable, deforestation may reduce poverty without any significant negative environmental consequences, at least at the local level. A key question is, however, whether the activity undertaken after deforestation is environmentally sustainable. Can the productivity be maintained over time? What are the *off site* effects on land erosion and watersheds? Or, to put it in terms of environmental economics: does deforestation have sizeable negative externalities?

Valencia showed that the people living in the forest areas, the Bugkalots, and the outside world represented by the government, in-migrants, and (legal and illegal) loggers were in conflict over the use of the natural resources. At the heart of the problem was the Bugkalots' claim to the area where they live as their ancestral land. This would imply that the government could not award the land to other groups, such as loggers, in-migrants or developers. Because of the insecurity of their rights, the Bugkalots opposed vehemently the construction of a dam, even if the most recent construction plan was estimated to cause minor environmental damage – and even if the Bugkalots themselves would have received some of the benefits of the dam.

The second source of environmental conflict between Bugkalots and the outside world arose from land use. Bugkalots were using shifting cultivation methods and the government wanted to terminate this. However, the Bugkalots claimed that the legal and illegal logging activities caused much more environmental damage. They added that their ancestral land should not be used as a 'watershed heaven' while loggers could continue their environmental destruction unabated.

Lesson 4. Reversing the Downward Spiral by Making Environmental Conservation Compatible with Uses Profitable to the Users

The all-too-common story is about local communities losing resources and resource rights to outsiders. The good news is, however, that the outside world can restore the balance between poor people and their environment by returning the rights and thereby changing the incentives. Chitsike's study of the CAMPFIRE programme in Zimbabwe illustrates this well. Before colonial rule, the people had maintained a balance between their needs and the environment. The poverty of the people was not threatening this balance, nor was there environmental degradation that would have caused poverty. During the colonial era, however, not only was the original population driven away from their lands to less fertile and productive areas but the crown also designated their land and wildlife under its ownership.

As neither the land nor the wildlife were any longer theirs, the incentives of the local population changed dramatically. Local population had always regarded wildlife mainly as pests, which destroy their crops and endanger their lives. As the value of wildlife--in particular the ivory of elephants–increased, people started to use the elephants as a *de facto* "open access" resource. The inaction of any group of villagers would not have changed the incentives of other villagers to try to derive benefits from the elephants, either by participating in poaching or by turning a blind eye to it. At minimum, the local population often did not even resist poaching (because less wildlife was better to most people). The licensed hunters of wildlife had paid the hunting fees to the government – the poachers paid at least some compensation to the villagers. No wonder that elephant and other wildlife populations decreased not only in Zimbabwe but also in most other African countries.

The CAMPFIRE programme changed the property rights to the wildlife and allowed for the "consumptive use" of the wildlife. The hunting fees - or trophy

licenses - were now paid to the districts where the wildlife was killed. The government was still responsible for setting the quotas and monitoring that they were adhered to. The attitudes and actions of the poor have changed dramatically in the districts where the CAMPFIRE programme has been operating. When the user rights of wildlife were transferred from the government to the people in the communal areas, the poor could get benefits by safeguarding the wildlife. The local population had no longer an incentive to let anyone shoot "their" wildlife without compensation. Thus, illegal hunting ceased and the government quotas have been adhered to.

This development has been beneficial to the environment, but poor people have also gained. The income of the consumptive use of wildlife has been paid back to the districts, wards and villages, thus alleviating poverty. CAMPFIRE income has been fairly modest but not marginal. Also the use of funds has been encouraging: when deciding between themselves, eight villagers in Binga district decided to enlarge their schools, to maintain the wildlife fences, and to improve health care, as well as to save a portion of the income and to get cash dividends.

The CAMPFIRE experience underscored the importance of the issue regarding who has the rights to natural resources. If the rights are allocated to the (poor) people who have a direct interest in conserving nature, they will be protective to their environment. This is simply because their environment becomes their own asset and they have the right to use it. The "consumptive use" of wildlife under CAMPFIRE is contrary to the ideology of extreme ecologists. However, the alternative – business as usual – is even less appealing.

The important lesson, drawing particularly on the CAMPFIRE experience in Zimbabwe, is simple, yet powerful, and hard to turn into practice: *make the uses of the resources which are compatible with long term conservation the most profitable for the users*. There are several caveats to this proposition: First, it implies that, say, a forest must be used; a "pure conservation" programme is not likely to work (except if some transfer mechanism for national or global willingness to pay for biodiversity maintenance and other protective functions is in place). Second, there must be a market for the conservation-compatible uses. In the CAMPFIRE case, the market consisted of rich foreigners willing to buy 'licence to kill' elephants and other game. In other cases, a more intensive use and marketing of non-timber forest products (NTFP) could prove to be the best alternative. Third, even though the conservation-compatible uses may in the aggregate be the most profitable, they must also be so to the individual users. In the CAMPFIRE case, a substantial amount of the hunting fees were transferred to the local community. The local users therefore had a (property) right to (the income from) the forest.

Lesson 5. Poverty and Environmental Degradation are Normally the Outcome of the Same Processes

The case studies in this book supported the hypothesis that environmental degradation causes poverty, and in some cases showed that poor people have been degrading their environment. Poor people have shorter time horizons and fewer resources to invest in the protection of the environment. It was, however, less clear that the direct reason for the degrading behaviour was due to their poverty. In many cases it seemed to depend rather on their *de facto* rights to the natural assets. Poor people tend to be more protective to their environment when they perceive the environment as their own. If their rights or entitlements deteriorate, their attitude and behaviour are likely to change.

Empirical studies, including those of this book, suggest that the simple poverty-environmental degradation hypothesis gives a very incomplete characterization of both the existence of poverty and environmental degradation. Poverty-environment vicious circles often exist, but it is more important to focus on the factors which create and maintain these. The coexistence of poverty and environmental disruption could more appropriately be seen as the joint consequence of limited opportunities for some groups, uneven processes of development, an unequal distribution of rights and power, and misguided policies.

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CROP – The Comparative Research Programme on Poverty

The Comparative Research Programme on Poverty was initiated by the International Social Science Council in 1992. The major aim of CROP is to produce sound and reliable research based knowledge which can serve as a basis for poverty reduction. CROP is organised around a broad international and multi-disciplinary research arena which allows entry to all poverty researchers and others interested in a scientific approach to poverty. CROP organises regional and topical workshops and international conferences, initiates and co-ordinates comparative projects and publications, offers educational courses, and invites its members to consult for national and international agencies. More than twelve hundred researchers and others have joined the CROP network, close to half coming from so-called developing countries and countries in transition.

The objectives are to:

- consider how the social sciences can contribute to the understanding of poverty in a global context;
- compare the different theoretical approaches so as to understand better their links and relationships;
- consider how scholars working within different paradigms can develop a joint arena for multi-paradigmatic research;
- develop further an international scientific network which will give impetus to a long-term program;
- secure and generate high quality data of importance for different social science approaches to the comparative study of poverty;
- through comparative studies create a body of scientific knowledge which can be used for the reduction of poverty.

This book is a collection of empirical studies exploring the linkages and interrelations between poverty and environmental degradation. Most of the papers emerge from a CROP workshop held in Sabah, Malaysia. They give fresh insights into the ongoing debate on poverty-environment linkages while questioning popular and simplistic views on the links.

The studies support the notion that environmental degradation causes poverty, and in some cases also show that poor people have been degrading their environment. They further suggest that the simple poverty-environmental degradation hypothesis gives a very incomplete characterisation of both the existence of poverty and environmental degradation. Although poverty-environment vicious circles do exist, it seems more important to focus on the factors which create and maintain these. The co-existence of poverty and environmental disruption could more appropriately be described as the joint consequence of limited opportunities for some groups, uneven processes of development, an unequal distribution of rights and power, and misguided policies.

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