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COMMON PROPERTY RESOURCES IN SOUTH AFRICA'S
LESS DEVELOPED AREAS : SUSTAINABLE DEVELOPMENT ISSUES

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1 INTRODUCTION

Common property rights regimes and the use and management of common-pool resources in ecosystems under stress are subjects that currently receive much attention in South Africa as the country moves towards a new political dispensation in which the redistribution of land and land tenure reform will feature strongly on policy makers' agendas. The stress factors that are of paramount importance in this particular situation, now and in the immediate future, include population growth, social and political upheavals, and government intervention.

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Because this paper focuses on the concept of sustainable development in a changing South Africa and because there are so many interpretations of the term "sustainability", it is appropriate to begin by defining this term (Erskine, 1992a). Thus, sustainability (pertaining to development overall) is a relationship between dynamic human economic ecosystems in which (a) human life can continue indefinitely, (b) human individuals can flourish, and (c) human cultures can develop, but in which effects of human activities remain within bounds so as not to destroy the diversity, complexity and function of the ecological life support systems. Within this context, some of the more important objectives of development in the less developed rural areas of South Africa can be listed as follows :

- * To improve local opportunities for enterprise, wealth and job creation.
- * To help people attain greater self-reliance in the provision of basic needs and services.
- * To help people attain self-generated and self-sustaining economic and social development.

The dynamic system of which these objectives form a part is summarised in diagrammatic form in Figure 1.

Sustainable development in a national economy implies a stable and satisfactory relationship between production and consumption (Erskine, 1991). It implies a population level or growth rate that is supported on a long term basis. It also implies that environmental hazards and damage are controlled. Sustainability requires sufficient equity in access to production capacity and distribution to ensure political stability. For present purposes, sustainability, meaning sustainable land use, will be defined as follows : production + conservation = sustainability. Douglas (1984) distinguishes between sustainability as "food self-sufficiency" (an economic perspective), "stewardship" (an

ecological perspective), and "community" (a sociological perspective).

Land degradation is a problem in rich and poor, capitalist and socialist nations, rural and urban areas. It is a major threat to development and quite possibly to the survival of mankind and other organisms. A major challenge in the coming decade facing the world, and certainly also South Africa as it moves towards a new era in terms of improved access to and use of land for all sectors of its population, is to learn how interactions between development and environment can be better managed to increase prospects for ecologically sustainable improvements in human well-being.

This paper presents the findings of research conducted in South Africa to determine the likely environmental and social consequences as the nation moves towards significant land reform, including the possible redistribution and/or privatisation of the commons, and a resulting changing pattern of land use. Particular attention is given to woody perennial resources (biomass) and communal grazing lands.

2 COMMON PROPERTY IN THE LESS DEVELOPED AREAS OF SOUTH AFRICA

Common property resources in the less developed areas of South Africa referred to in this paper are the following :

- * Communal grazing lands
- * Woody perennials
- * Water
- * Wildlife

Wildlife is the purest form of common property. Unlike cattle which are invariably privately owned though grazed on the common grazing land, within a communal system wildlife would be a common property. Similarly, business ventures based on wildlife, ecotourism, safari hunting, culling, etc, would represent income (and loss) to the community. In most communal systems, cattle, goats and wildlife would be run together. The value of wildlife is derived from operational results and can be converted to a price per unit of land.

Customary land tenure systems are under increasing stress in some African countries. Traditional tenure systems are breaking down as a result of government policies, market influences and demographic pressures.

In some developing areas, grazing land is being converted, usually illegally by individuals, into marginal arable land. In many cases it represents an enclosure movement, that is, the privatisation of common property, often into uneconomic units.

3 RURAL DEVELOPMENT IMPERATIVES

South African society has been characterised in the past by gross inequalities in the distribution of resources, not least of which is land, and access to opportunities (Erskine, 1992b). There is

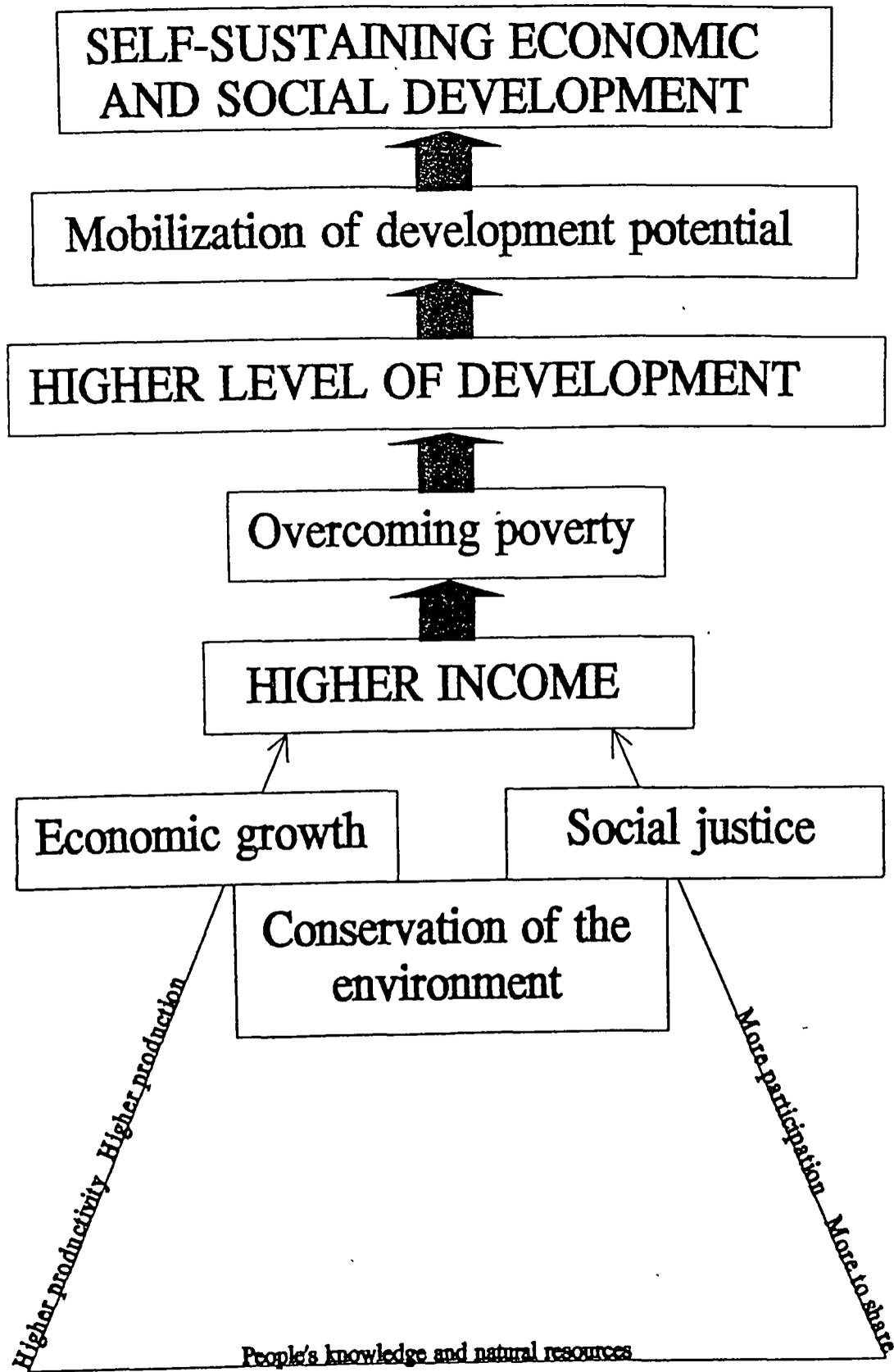


FIGURE 1. A dynamic system for attaining self-sustaining economic and social development.

presently a wave of rising expectations among the black community, some quite legitimate, some irrational and aggressive and threatening - but all associated, in one way or another, with eliminating inequality. There is a growing understanding that much of the development problem facing the country as a whole is located in its less developed rural areas and that, therefore, the priority for creativity and innovation must be associated with rural development, and the allocation and use of land in particular.

Sustainable utilisation of land in South Africa is both a technical and a political economic concept and it can be achieved in a number of different ways. There is a need to include the future prospects of black farmers for access to land, capital, extension, government assistance and so on, in any assessment of sustainable production. Clearly, this covers potentially controversial political ground and is subject to conjecture, but it is necessary to pursue the issue in a realistic and practical direction. There are pervasive sets of relations in production and exchange which the state can and does effect, and the nature of which even mould the state itself. One of the most important is the distribution of land. Great inequality of landholding, absent from very few developing regions outside the socialist countries, encourages the creation and reproduction of the functional dualism found in South Africa and elsewhere. Land reform is not a sufficient condition for reducing land degradation, but may be a necessary condition, hard to grasp though this nettle is for a great many governments. Even limited tenancy reform can, if actually implemented, discourage mining of the soil held under short leases and encourage tenants to invest in the land, though if such reform is combined with pressure to produce more crops it can be ineffective from the point of view of conservation.

3.1 Resource issues

Traditional farming systems in South Africa, while ecologically sound and adapted to prevailing conditions and needs of the farmer when population density was low, are becoming increasingly outmoded and unable to meet demands of rapid population growth, high rates of urbanisation, increased mobility, and rising incomes. The result is land degradation. The conclusion to be drawn is that subsistence agriculture (or more usually sub-subsistence agriculture for most families) is not sustainable, neither in economic nor in environmental terms.

Small-scale farmers in South Africa most often engage in a system of farming that places emphasis on multiple outputs and the satisfaction of immediate household needs in the first instance (bottom half of Figure 2). These farmers employ particular practices because they perceive these as being the most efficient ways of meeting their production goals using the resources of land, labour and capital available to them. As their resource endowment (for example, land) changes so their strategies are likely to alter. Equally, their assessment of the most efficient farm strategy to employ is likely to be influenced by the broader

framework of needs and opportunities linked to off-farm activities. Analysis of what is an efficient use of resources has, therefore, to be carried out in terms of the production objectives being pursued.

3.2 Remodelling land ownership and use

The political nature of the land issue, as well as its importance in the debate on the economic system, makes the land issue central in politico-economic debate in South Africa. There is general consensus within the country that remodelling of land ownership can be done principally in one or both of the following ways :

- * A market orientated method with state support to the advantage of the landless or small farmers.
- * Ways where the state takes over ownership and production in the agricultural sector and controls (runs) or relocates it.

There are several methods in both cases to attain the objective of reforming land ownership. In this paper, attention is directed in particular to the need to ensure equity (equal opportunities for all people to acquire land) and sustainability (non-destructive use of the land) as end results of the remodelling process in the less developed rural areas of the country.

3.3 Achieving sustainable development

Clearly, new approaches are needed to achieve sustainable development in South Africa's less developed rural areas. World Bank studies in similar situations elsewhere in the world (World Bank, 1992) suggest that future efforts must build on the crucial cross-sectoral links and synergies of the population-agriculture-environment nexus. They should also place far more emphasis on promoting effective demand for environmentally benign intensive farming, family planning, and resource conservation. Simply put, successful agricultural development necessitates adequate attention to demographic and environmental concerns, just as preventing further environmental degradation requires intensifying agriculture and lowering fertility rates and population growth.

Research and extension services need to focus on environmentally benign and economically viable agricultural techniques (for example, contour farming, intercropping and crop rotation systems, and water harvesting), along with the promotion of increased fertiliser use and farm mechanisation. Creating demand for intensive and resource-conserving agriculture requires appropriate marketing, price, tax and exchange rate policies, as well as investments in rural infrastructure, health and education facilities (Erskine, 1992c). Creating conservation areas and protecting these against encroachment will be important. If know-how and inputs are available, land scarcity induces agricultural intensification. Tenurial security stimulates land conservation and tree planting.

Eliminating open-access systems is of utmost urgency. Where

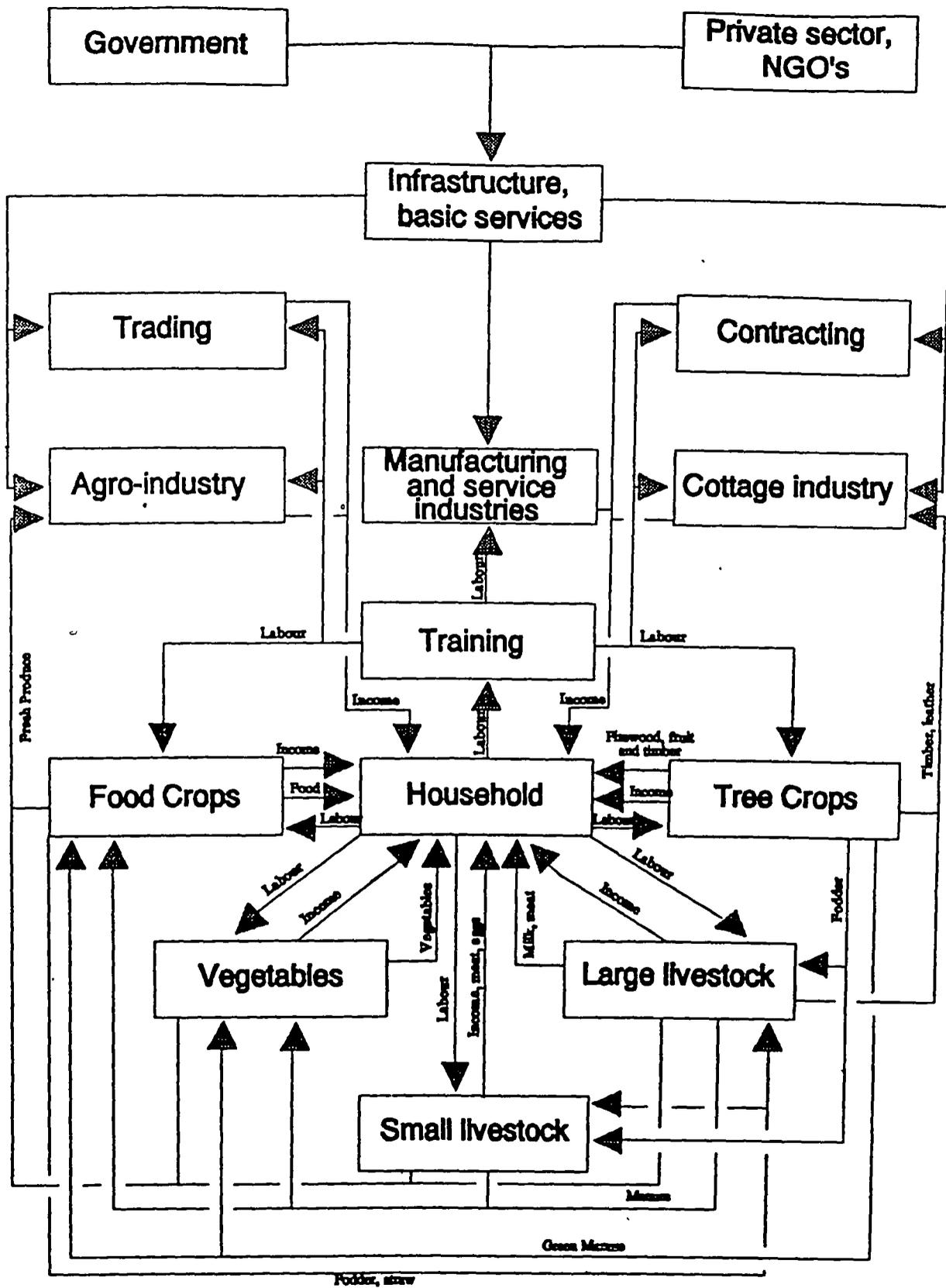


FIGURE 2. Model of rural household system proposed for small land owners in South Africa.

traditional tenure systems are evolving towards explicit recognition of individual ownership and transfer rights, they should be protected by law and supported by appropriate administrative arrangements. State ownership of farm land should be eliminated. Where possible, forest and range lands should be assigned to traditional users or local communities, with use rights linked to the responsibility for conservation. Where traditional systems have collapsed, individual titling is likely to be needed, but it should be provided only on demand and to the customary owners. Women need the same rights to land and tenurial security as men.

Extensive agricultural activities can have a major impact on the environment, farming, the rural energy economy, and women's time. Woodfuel markets will develop more rapidly if open access to fuelwood is eliminated, people can freely market wood from their own land, and communities and farmers have uncontested ownership of local forests and woodlands.

Protecting forests and other conservation areas stabilises local and regional climate and hydrology, stimulates agricultural intensification, and ensures the provision of forest products and environmental services. Appropriate targeting of urban and infrastructure development can be a powerful tool to guide settlers into environmentally resilient areas with agricultural potential and keep them out of fragile areas. Regional and local land use plans can go far in reconciling objectives of natural resource management, population and settlement policy, and agricultural and infrastructure development. The local people need to be directly involved in formulating and implementing such plans.

3.4 Integrated development initiatives in a changing South Africa

Any integrated development strategy for less developed rural areas must focus on people (Erskine, 1992). Active participation by the rural population must be promoted to strengthen confidence in their own capability and encourage the independent action that is so vital in the development process. To encourage the display of self-initiative, development executants (government, non-government, private sector) must create and secure the framework conditions that promote development, provide the necessary infrastructure and create scope for action.

Experience has shown that there are three elements of "development" that must be emphasised and linked together in the integrated development processes; these are economic growth, environmentally sound use of natural resources and social justice. None of these elements can be isolated and considered as an independent sub-goal: development can only be achieved through the interaction of all three. For example, growth cannot be allowed to destroy nature's equilibrium in the long term. Growth is achieved through the regional population's own efforts and they must also reap its benefits; but the individual will not gain any benefit unless economic growth exceeds demographic

growth.

The focal point of integrated development must be overcoming poverty which has been generated by underdevelopment. To achieve this goal, the integrated development approach must aim at making people capable of helping themselves, in order to improve their social and economic situation. Thus, people are both the means and the goal of development. The term "people" should be taken to mean family units, each of which can be seen as a production unit, a consumer unit and an element of society. The rationale for integrated development is based on the belief that the welfare of family units can only be improved, and poverty reduced, when development promotion incorporates (and systematically networks) every area that can have a significant influence on the rural family : education, services, infrastructure, agriculture and forestry, small industry, economic policies, etc (i.e. a multi-sectoral approach is required)(top half of Figure 2).

4 PRIVATISATION OF COMMON PROPERTY RESOURCES

The persuasiveness of Hardin's argument (Hardin, 1977) relating to the breakdown of common property resources (CPRs) has led many to urge privatisation of CPRs (Johnson, 1972; Picardi, 1974) and it has been proposed also in South Africa as part of the land ownership remodelling process. Some writers (Lowe and Lewis, 1980) have suggested that because the necessary bargaining between unequal parties has high transaction costs if it is to cover all sources of damage, and because a set of bargains between individuals does not necessarily lead to a socially optimal solution, the only effective response to the problems created by individual CPR users externalising the costs of their usage is the assumption of certain property rights by a regulatory agency. Whilst it is clear that CPRs are distinctive and are managed differently from private resources (PRs), it is equally obvious that CPRs and PRs frequently have very close relationships; pressures upon one set may well be transmitted to the other. Most of the formal modelling of decision-making in the use of CPRs ignores this very important dimension, particularly characteristic of rural economies but by no means unique to them. It is perhaps true to say that PRs and CPRs are more usually found to be functionally related, and that CPRs alone rarely provide the whole livelihood of any rural people. A common situation in the less developed rural areas of South Africa is that in which holders of PR also use CPR land, so that the farming system includes both types of property and the resources found on them. Changes in the circumstances of either PRs or CPRs have impacts on the usage of the other. In KwaZulu, for example, use of common pasture to feed livestock which work and manure the PR fields is an essential part of the whole system, but it is threatened by degradation of the CPR resources under heavy pressure; livestock are reduced and are unable to deliver sufficient plough-power and manure to PRs.

It is worth noting that very frequently in other countries, especially in modern times, the state has sought to control and

regulate CPRs and in effect to interfere in the decision-making rules of their management. The removal of responsibility of management from the community (however unequally it used to operate in the distribution of benefits from CPRs) to bureaucratic decree has often been disastrous.

Studies in KwaZulu indicate that CPRs are used mainly by the rural poor. Inequality in private property resources is partly reduced due to the presence of CPRs. Decline of CPRs, both in quantitative and qualitative terms, will mean greater loss to the rural poor. At present we do not have data to compare losses to the poor due to decline of CPRs with the gains the poor might make through acquisition of some CPR as private land. However, the experience of others has been that the bulk of privatised CPR lands have not reached the landless, but have gone to those who already owned land (Jodha 1985). Furthermore, it has been found that those able to gain from the process of privatisation of CPR land are those best placed to use the remaining CPR land for commercial enterprise.

A further concern is the effect of privatisation of CPR land on the land itself. For example, on land converted from pastoral to arable use under privatisation, we are likely to see all the consequences of using ecologically marginal land without regard for its resilience.

The aim of development is to improve the quality of human life. It should enable people to realise more of their potential and lead lives of dignity and fulfilment. Economic growth is part of sustainable development, but it cannot be a goal in itself. In lower income countries, and in less developed areas of countries like South Africa, sustained economic growth is needed urgently to improve the quality of life. Although people differ in the methods they would employ for achieving development, the goals of development are virtually universal. These include a long and healthy life, education and job-oriented training, satisfaction of basic needs (i.e. access to the resources needed for a decent standard of living), political freedom, guaranteed human rights and freedom from violence.

Communities and local groups provide the easiest channels for people to express their concerns and take action to create securely-based sustainable societies. However, such communities need the authority, power and knowledge to act. People who organise themselves to work for sustainability in their own communities can be an effective force whether their community is rich, poor, urban, peri-urban or rural. If communities are to organise themselves and take action, they need the catalysis of trained people to initiate and maintain the process; these may either be their own people who have received appropriate training or trained people willing to live and work amongst the needy communities.

Taking a closer look at less developed rural areas, it is clear that risk and avoidance of risk loom large in decision-making by rural entrepreneurs and farmers, often modifying or overriding

other economic considerations. Living, as they do, at or close to the margins of existence, poor farmers and entrepreneurs are concerned to avoid any change which, though it might improve their situation if it functions well, could leave them even worse off if it does not. Equally, there is likely to be a preference for choices that reduce existing risk even if these offer less potential for economic improvement than alternatives. Clearly, there is a need to provide rural people with the information they need, for example, a description (including a straightforward cost benefit analysis) of possible alternative forms of land use/business enterprise and how to implement the different farming systems/enterprises, so that they can make an informed choice and venture into new operations. This information can be provided through training of entrepreneurs and of community representatives and/or extension people who will operate (and serve as trainers) amongst the rural communities.

5 SUSTAINABLE AGRICULTURE

Described more precisely, sustainable agriculture should involve the successful management of resources for agriculture to satisfy changing human needs while maintaining or enhancing the quality of the environment and conserving natural resources (Erskine, 1992d). In this context, 'successful' implies that the production system should generate adequate income and 'otherwise be economically viable and socially acceptable. 'Management' includes policy decisions that can affect agriculture at all levels, from national governments to the individual producer. 'Resources' includes inputs and manufactured goods coming from outside the agricultural sector (for example, agricultural chemicals, machinery, etc). 'Maintaining the quality of the environment' suggests that changes in the environment or the availability of natural resources should not threaten the capacity to meet changing needs and that production needs should be met without unnecessarily damaging natural ecosystems.

It is very apparent that in the less developed areas of southern Africa it is primarily population growth that threatens the possibilities for sustainable agricultural development. The increasing population densities lead to increased pressure on natural resources and force poor farmers to expand into more marginal areas, resulting in a trend to intensify agricultural production. The traditional production systems often do not provide adequate possibilities for such intensification since they are characterised by utilising externally produced inputs only to a very limited extent.

In the light of this presentation of the problem, the task in the less developed areas is therefore to develop alternatives to traditional production systems. More specifically, the alternative in mind is termed 'open production systems', that is, systems which utilise external inputs and which are able to produce a surplus. Only through such systems will it be possible to relieve the pressure on natural resources and ensure sustainable agricultural development.

6 TRADITIONAL RANGE AND LIVESTOCK MANAGEMENT SYSTEMS

Stocking at high rates on communal land makes economic sense. The economic carrying capacity of a system is determined by producer objectives. In beef ranching this is determined by maximising productivity per beast in terms of meat output. In contrast, on communal land producers want to maximise the available animals for manure and draught per unit area. The levels of stocking are determined by these economic objectives. Thus, economic carrying capacity is different to the ecological carrying capacity. Ecological carrying capacity is variable and determined by the environment. In beef ranching systems the economic stocking level is well below ecological carrying capacity, but in the communal land system stocking rates tend towards this level. In a high use system of this type the effect of high stocking rates on long term ecological sustainability remains poorly understood.

Decades of research have been required to determine optimal stocking rates for meat production per animal under ranching. Communal land objectives are much more complex and the trade-offs between declines in manure and draught productivity with declining feed intake at higher stocking rates are not known. In order to recommend communal land stocking rates suited to local economic objectives, considerable applied research will be necessary.

Arguments about degradation and sustainability are as much about economic objectives as they are about ecological processes. We need first to know what is the preferred state for a particular form of production before we can establish what degradation is. If we are concerned about a national park, the diversity of animals and plants may be important to attract tourists and to conserve biological diversity or rare species. On a commercial ranch with seasonal feed supplementation, a rangeland that maximises beef production is optimal (usually low tree cover, maximum grass cover, etc). On communal land, rangeland that can maintain high livestock biomass is the desired state. This means ensuring the availability of key resources, the possibility of inter-zone movement and the provision of browse and other drought/dry season reserve fodder sources.

With the starting point defined by economic objectives, the measures that will define degradation can be sought. In a national park, decreased biological diversity or extinction of rare species may be the indicators of degradation. On a ranch, increased bush, decreased perennials, etc, are the indicators used to show that decreased beef production per unit area will follow in the long term. These indicators are of limited value on communal land. We need to disaggregate and discover what indicators are appropriate.

The question to ask for the communal land situation is : what are the factors that, in the long run, will decrease the productivity of the communal land production system? The crucial objective is to keep as many cattle alive for ploughing and manure as possible, combined with maximising small stock meat production.

This means ensuring survival in the long term, during droughts.

The lack of standing grass biomass, by itself, should not be an indicator of degradation. If it has been eaten it has been productively used. It is important to realise that biomass does not equate with productivity. A closely cropped grassland is generally more productive than tall moribund stands. The presence of trees in grazing land too should not be used as an indicator of rangeland degradation. Trees may act to enrich the soil and provide environments for nutritious fodder. Trees are also vital in providing a browse resource for cattle, donkeys and small stock. In a high-use system, where most of the grass is consumed, this is crucial. Similarly, a change in grass species is a poor indicator of degradation as this is often caused by climatic and other factors and may be beneficial in providing more nutritious fodder.

Soil loss from the topland grazing areas is obviously a cause for concern, but empirical studies which document the extent and pattern of loss and its effects on plant productivity are not available. Loss of soil at the field level may be of a different order of magnitude to loss of soil at the catchment scale, as much soil tends to be redeposited again (Stocking, 1987). Degradation of toplands can sometimes lead to compensating accumulations of soil and water in bottom lands. It is important to specify the spatial scale at which there is concern about degradation.

The economics of sustainable development is poorly developed. If future generations are not to suffer the consequences of current environmental degradation then the cost of future degradation must be discounted to the present to ensure intergenerational equity. In project planning, the discount factor used is generally the social discount rate although it is rather arbitrary.

The long term impact on communal land livestock production of continued soil losses can be assessed in an economic context to give some perspective to purely conservation arguments. It has been estimated that the useful life time of a soil being eroded under conditions of intensive use on rangeland in Botswana is in the order of several hundred years. The costs of conserving this soil and extending its life beyond this are heavy. A simple model estimates that a five per cent reduction in soil loss can only be achieved with a 49 per cent level of destocking. This obviously would not be economic. Our ability to make land use plans operative over centuries is constrained by the knowledge that rapid changes in population, technology and economics will most certainly intercede. The soil under traditional farming systems may well last much longer than the oil used as the basis for commercial farming systems!

A concentration on 'key resources' may be a better way forward. Discounting the future may happen automatically if communities are given the opportunity to take the long term view through security of tenure and community involvement in decision making

and local planning. The understanding of the system from a farmer's perspective also allows the identification of key resources and processes that can be the focus for management and conservation support.

Agricultural economists have investigated the supply response of peasant livestock producers in southern Africa (Low, 1980). For a stock poor communal land farmer, a higher price means that the standing asset of cattle is raised and there is greater incentive to hold on to it for its productive benefits as replacement becomes more costly. The conditions under which commercialisation through sales can occur need to be investigated.

BIOMASS MANAGEMENT

7.1 Biomass initiative

In energy terms the developing sector of the South African population is characterised by the fact that they do not readily have access to the national electricity grid. A multiplicity of fuels are being used, with paraffin and coal playing the biggest role in the urban environment, while as high as one third of the population, mainly in the rural areas, are still dependent on firewood as the main energy source.

Traditionally, firewood has been regarded as a "free good" harvested from the natural vegetation. Over-exploitation of this resource as a result of high population densities and overgrazing progressively results in shortages, severe environmental damage and concomitant hardship. In fact recent estimates indicate that at the current rate of utilisation the country will be completely denuded of natural woody vegetation within the next 30 to 40 years. The availability of sufficient and secure sources of energy to the developing sector should be an integral element of programmes aimed at combatting poverty and improving the quality of life.

The introduction of "social forestry" into rural subsistence farming activities as part of rural development programmes is seen as an important element of energy provision, especially in the rural areas where electrification from the national grid is bound to be an option only over the much longer term. Against this background, the South African Government has initiated its Biomass Initiative, the planning phase (already commenced) of which comprises five major elements :

- * Biomass assessment and woodfuel surveys - aimed at quantifying the current situation.
- * Woodfuel production - the establishment of demonstration sites representative of all climatic regions and probable approaches, both to demonstrate and to select successful ventures.
- * Infrastructure - investigating the provision of critical infrastructure such as training of extension staff, establishment of nurseries and the supply of water.
- * Woodfuel consumption management - focusing on the management of the demand side of woodfuel through, for instance, the introduction of fuel efficient stoves and the

related biogas technologies.

- * Awareness creation, education and information dissemination.

7.2 Potential conflict and its management

Around the world, community efforts to use trees and forests sustainably inevitably face challenges that involve conflicting interests or needs of people (Pendzich, 1993). Local communities are aware of the importance of being able, together, to manage their natural resources in a manner that will provide both for their immediate needs as well as those of their children. But many communities face obstacles in their efforts to maintain or develop sustainable management of their forest resources. Difficulties may arise from differences in views among members of the same community. Or, two or more separate communities, each with legitimate claims of access to the forest resources, may clash over use. Or, the communities' interests may diverge from those of government agencies setting a policy of forest conservation or from those of outside commercial interests wishing to exploit these resources.

A community's ability to constructively address controversial issues, particularly those relating to common property, and sometimes outright conflict can be very important to the success of its efforts to develop a viable local economic base while preserving the forest for future generations. Communities have devised a variety of ways to address these challenges. Some have a council of local leaders/elders, who meet periodically to review and decide on issues as they arise. Others rely on more ad hoc, case-by-case discussions among community representatives, local political leaders and technical experts from government agencies or NGO's to come up with answers to issues.

In too many cases, however, conflicts are simply ignored or allowed to get worse because the community no longer has a functional system for addressing them and finds that its traditional means of dealing with such problems may not be adequate to meet new challenges. The rapid changes that have occurred during the last few decades have created new power constellations that render the old systems ineffective.

Also the processes or mechanisms for solving problems and making decisions are too often neglected in the design and implementation of outside (for example, donor or government) initiated community forestry activities. Outsiders are often unaware that different interest groups exist. Local checks and balances are put out of play and local institutions previously responsible for dealing with such issues are often undermined.

7.3 Individual ownership and community woodlots

Naturally, people wish to attach far more clear cut ownership rules to planted trees than they do to tracts of bushland. But often they can see that no effective corporate group exists competent to manage a village woodlot. Foresters have found, in

consequence, that they can interest villagers in tree planting on their own land far more easily than they can start a village plantation and that successful farm forestry programmes are easier to promote.

Rural people originally plant trees with a view to income generation, but may end up preserving the trees as insurance against emergencies. This means that, though the tree planting goes well, the tree harvesting will go far more slowly than anticipated because of the risk calculus of the tree owners.

Almost everywhere that woodlots on communal land have reached the stage at which the local community/forestry interest group should take them over, reluctance to do so has been encountered. Even in the longer running programmes only a small proportion of the qualifying woodlots have been transferred; and then the transfer of responsibilities has usually been of a limited nature.

A number of reasons for this failure of communal bodies to take on responsibility for management can be discerned :

- * Control carries with it financial responsibilities which communities have difficulty in meeting - as a minimum hiring watchers to protect the woodlot.
- * Woodlot management plans, village forest rules, etc, are often complex, unclear and require skills and experience that communities do not possess. Very few communities have had experience of management of anything remotely resembling a woodlot; and the task of acquiring the necessary skills is complicated by management systems which reflect the technical orientation of the forest departments
- * Continued involvement of the forest department discourages local bodies from taking over and encourages communities to opt for extending forestry department management.
- * Lack of interest in the woodlots because of their smallness relative to local needs, difficulties in ensuring satisfactory distribution of benefits, and uncertainties about their status and access to the benefits.
- * Undermining security of access and tenure by the uncertain legal situation. Establishment of a communal woodlot often entails the transfer of a parcel of land held individually or communally under customary law, to collective ownership. This process of redesignation can often lead to conflict. Redesignation could be strongly resisted by those who owned or had usufruct rights over a parcel of land identified as a site for a communal woodlot. This resistance is often strongest in those communities least disrupted by villagisation where pre-existing decision making groups maintain a stronger hold over the allocation of land and other resources.

Uncertainty about the tenure of land brought under communal woodlots is also bound up with apprehension about who would actually benefit from them. In a significant number of instances where the decision was taken not to start a woodlot, people expressed a degree of mistrust in the local tribal authority

7.4 Social forestry imperatives

Support to the empowering process for tree planting/forestry interest groups should include the following :

- * Organisational aspect : this support aims to strengthen the groups through a process of adult education and conscientisation towards self-confidence and local initiatives.
- * Human resource development aspect : This support aims to provide the group members with relevant skill. Training can be carried out in topics such as leadership skills, small-scale enterprise management, administration and bookkeeping, soil and water conservation and livestock management.
- * Self-help development aspect : group members are provided with an opportunity to learn about saving and managing their own capital for productive activity and how to get credit to expand these activities.
- * Production aspect : group members are assisted to improve their agricultural production through provision of seeds and fertilisers as well as better marketing information.
- * Social acceptance aspect : groups are not only there for the members but also for other individuals who have not joined. Members should be encouraged to share their resources with non-members through voluntarily contributing labour or money to social activities such as building or repairing community infrastructure, maintaining water channels, etc.

7.5 Land rights and tree rights

Although tree tenure is separate from land tenure, many obstacles prevent poor people without land from planting or owning trees. Many of the 'landless' in South Africa have small household plots but often these give little scope for growing trees. Proposals to permit landless people to grow trees on public and waste lands, like roadsides, river banks, and other common or government land face bureaucratic problems.

Rights to jewellery, livestock, land and bank deposits are usually clear (though they can be complicated with large stock), and rights of owners to lease, mortgage, pledge or sell such assets are usually undisputed and unimpeded by law or bureaucratic regulation. But quite often rights and capability are restricted with trees. With much social forestry, for example, rights are at best ambiguous. The poor are meant to benefit from the trees planted, but often do not own them or have rights to harvest them. Even where trees are on their own land, they are often prohibited by law, and impeded by bureaucracy, from cutting them down when they want to.

Land tenure is clearly of central importance in tree planting in the less developed rural areas. People will only take the risk of planting trees and protect them if they are confident that they will ultimately benefit, and this will only happen if their claim to the land and the trees is secure (Erskine, 1989).

Tenure in agricultural societies has typically been interpreted as the bundle of rights of use or ownership of specific parcels of ground. Minerals and nutrients located below, and vegetation and fauna above the surface are considered ancillary. Much research has been devoted to studying land tenure but rarely has clear distinction been made between actual rights to the land (that is, the soil) and rights to the plants growing on the land. Contrary to common conception, the two are not the same. Many agricultural peoples differentiate rights to plants from rights to the land on which they are growing. Rules of ownership and inheritance often are quite different for the two. Acknowledgement of this distinction is especially critical to understanding agricultural tenure in agroforestry systems. Many rural communities worldwide have developed an economically viable agroforestry technology because their concept of absolute private ownership of plants meshes well with shared users' rights over land, and because the farmers are motivated to cultivate perennials, such as those integrated in agroforestry systems, to firm up their individual land rights. This is in fact happening in some of South Africa's less developed rural areas.

8 INCENTIVES FOR CONSERVING/INVESTING IN NATURAL CAPITAL

8.1 The rationale for creating incentives

It is undoubtedly the case that people will take an interest in a course of action if they see that there are real advantages as far as they are concerned. Thus, to interest people, particularly those living in the less developed rural areas of the world, in sustainable environmental management, there is a need to design and implement incentive packages that create obvious advantages for the people living in those areas. Equally, there must be some incentive for policy makers to encourage policy development, adequate resourcing, acceptance and adoption of policy, and implementation of policy (action on the ground). Thus, the introduction of a policy of promoting agroforestry will achieve nothing if the correct research/extension approach is not followed, as will be described later in this section.

The types of incentive usually introduced to influence people in respect of diverse issues, decision makers as well as land users, include the following (Erskine, 1992c) :

- (a) Political : introduction of measures that retain or shift the political support base or provide political platforms.
- (b) Command : interventionist measures that lay down the law (rules, regulations, statutes); fiscal measures are included here.
- (c) Economic : improved profit margins, increased revenue, market preservation or enhancement, resources preservation (to provide economic returns in the future).
- (d) Social : incentives that appeal to people such as the quality of life, standard of living, and cultural maintenance.
- (e) Moral : an approach linked to religious beliefs, heritage value or collective responsibility.

It is worth noting that economic and political institutions have often failed to provide proper incentives for sustaining ecosystems because of five major, possibly interacting, causes: short time horizons; failures in property rights; concentration of economic and political power; immeasurability; and institutional and scientific uncertainty. For example, the classic problem of overgrazing the commons is attributable to property rights failure. When access to the commons is not limited through some form of property rights, each farmer knows that the grass not grazed today will be gone tomorrow. Failures in property rights, in this case, lead to short time horizons.

Competition in markets may also shorten time horizons. There is evidence that more competitive firms face higher interest rates and undertake fewer long-term projects. Similarly, competitive forces in agricultural markets may induce farmers to take short-term perspectives for financial survival. Farmers must maintain yields and cash flow to satisfy bankers and to make a sufficient return on their land investments in both developed and developing countries. This has led to the adoption of high-yield crops, monoculture farming, and reduction in genetic diversity. The result is increased variability in crop yields under varying climatic and economic conditions.

Also, though high interest rates discourage the long-term management of slow growing resources (forests) and the protection of long-term environmental assets (biodiversity), high interest rates also discourage investment in projects which transform environments (dams) and in projects which are necessary to extract resources (gold mines). Thus, the relationship between interest rates and conservation (protecting the interests of future generations), and sustainable development sometimes appears to be ambiguous.

Introduction of appropriate incentives to persuade people to adopt sustainable environmental management policies will require the intervention of both government bodies and non-government agencies as well as selection of the right mix of incentives, depending on local circumstances. What is abundantly clear from experience worldwide is that public participation in the selection of the "right" incentives is absolutely vital. This participatory process should identify interest groups, determine the nature of any interests, assess the areas of latitude, and design or modify incentives accordingly.

Incentive approaches must take account of variable value systems (which are incredibly dichotomous in South Africa) and should be group specific, culture specific, education specific and even media specific, if they are to be effective. In summary, incentive mechanisms should be the most important aspect of policy implementation; there should be multiple incentives to satisfy most people; there must be public participation in determining incentives; and the incentives should be correctly packaged. Within this broad framework, we can proceed to examine the application of incentive packages in promoting sustainable land management in the less developed areas of southern Africa

in general and South Africa in particular.

8.2 Promoting sustainable land management in the southern African region

The southern African region shares with other Third World regions several problems in promoting sustainable land management. One is an authoritarian and centralised approach to resource management that was inherited from the colonial era. This approach emphasised the problem of soil loss and attempted to control this through the construction of physical conservation structures. In addition, it sought to control conservation behaviour through regulations, fines and other forms of coercion. Equally compatible with colonial and post-colonial bureaucracies, this approach has persisted despite 25-30 years of independence. Another problem is the widespread communal ownership of veld, forestry and wetland resources. Although use of these resources was formerly effectively regulated by traditional authorities, increased population pressure combined with the diminished legitimacy of traditional authority have rendered this control increasingly ineffective. The 'tragedy of the commons' is now a widespread feature of southern African communal resources. Insecurity of customary tenure on croplands, which retards long-term investment in land management, is another problem. Finally, economic mismanagement at the micro and macro levels has distorted price signals and provided unintended incentives for unsustainable resource use; economic stringency has so constrained governments' ability to act that conservation activities receive a low budget priority.

Little by little, attempts are being made to overcome these problems. Participatory, 'bottom-up' approaches to resource management receive widespread support in principle - although implementation is not always so vigorous. Nonetheless, Tanzania, Zambia, Swaziland and Lesotho, have begun to decentralise land management responsibilities and virtually every country is experimenting with popular participation (Hunter et al, 1991). In addition, the recognition that conservation is more concerned with water management and good farming than control of soil loss is gaining ground. Thus, biological and agroforestry methods and an emphasis on conservation as a component of sustainable agricultural production are receiving increased attention. To further these efforts, training is being provided to regional personnel in multi-disciplinary, participatory techniques, integrating conservation into the farming system, and integrated land use planning. To make these efforts sustainable, training centres with special strengths are being identified and developed as regional centres. A model village programme to identify, test and publicise existing efforts at participatory resource management is being developed. Several regional attempts are also underway to solve problems of communal access. In Zambia, Zimbabwe and South Africa, programmes are underway to get rural people involved in wildlife conservation by giving them a stake in the income generated from tourism and hunting. In Lesotho, range management areas have been demarcated and grazing associations formed to provide more effective management of

rangelands.

8.3 Economic and environmental reality in South Africa

In the rapidly changing situation in South Africa, environmental and natural resource management issues are likely to occupy a relatively low priority in the immediate future in the face of competing demands by the African majority for more jobs, a redistribution of land and a decisive role in government and administration. Nonetheless, South Africa faces severe environmental problems that must be addressed if the resource base is to continue to sustain economic development and a more equitably shared improvement in the standard of living. It is tempting to see a contradiction between economic growth and environmental protection. Not only is such a view untenable in the long run; it may also be unnecessary in the short run as well. The aspirations of the African majority and protection of the environment can be compatible. Indeed, environmental policy can be one of the tools for redressing the inequities of the past. It is the challenge of creative policy-making to ensure that this is so.

Four policy areas require special attention. One is the area of policy analysis and policy-making itself. Post-apartheid policies, many of which may be far removed from direct relation to the environment or resource management, must not exacerbate resource degradation either directly or, by setting up a chain of stimuli or incentives, indirectly. Indeed, it is important that they stimulate resource improvement wherever possible. It is also necessary that policies designed to aid the environment do so as efficiently and effectively as possible. Another area that demands attention is land redistribution. Lessons from elsewhere in Africa where large-scale land redistribution has been undertaken must be heeded and creative thought must be applied to both a method of redistribution and the resulting tenure and institutional support structures which facilitate and encourage sustainable land management. Common property resources are a third area to which heed must be paid. Partly as a result of apartheid policies that alienated a large proportion of the land from the indigenous inhabitants and partly as a result of rapid population growth in the rural areas, communal resources such as the land itself, streams, forests and wildlife are often under unsustainable pressure for use. A final area, closely related to the issue of common property, is the issue of pollution. Although pollution effects all South Africans to some extent, because they have neither the income nor mobility to escape it, it effects people in underdeveloped areas particularly severely. Water-borne diseases in the rural areas is a graphic reminder of this. Significant improvements in the African quality of life can be achieved if pollution is attacked energetically.

Resource and environmental degradation are not primarily technical problems, rather they are of a social nature. Although technology may form part of the solution, attempts at solution must start by addressing the socio-economic factors that cause people to misuse resources now. Invariably, people misuse the

environment because it pays them to do so and costs them to do otherwise. The factors that create these incentives must be changed if the environment is to be improved and preserved.

8.4 Community-based programmes

Community-based programmes will be necessary in South Africa if the result of land redistribution is not to lead to the erosion and deforestation found in the present underdeveloped rural areas. Even if land is redistributed in private freehold plots, community organisations may be necessary to address external spillover effects of private resource use.

Land redistribution and growth of jobs in the urban areas will relieve some of the pressures on communal resource use. Experience from Zimbabwe, Kenya and Swaziland suggests that this will be limited and temporary, however. A long-term solution lies with enabling the people left behind to more effectively manage their environment. If effective community-based management is to be fostered, two enabling factors are necessary. One is facilitating legislation; another is organisational structure. True community-based environment/resource management requires an organisation 'owned' by the community itself. Experience from elsewhere shows that the creation of such structures is often a very slow, painstaking process that may not best be entrusted to government. Policy can facilitate or block both of these factors.

The area of pollution is a difficult one and each situation probably has to be evaluated on its own merits. Generally speaking self-policing, market-based controls are preferable to regulated emissions and fines. It is cheaper to encourage people to do what they should than to force them to do what they do not want to do. This is still a new area in environmental economics, however, and needs to be examined in the South African context carefully. It clearly should be a priority area of policy analysis and development.

8.5 Economic incentives for sustainable land use in less developed areas

In South Africa in the past, discriminatory policies with respect to land distribution and public support, together with the high level of transaction costs under existing African tenure systems, have structured economic incentives within the less developed African farming areas (where subsistence agriculture predominates), leading to the apparent under- and over-utilisation of arable and grazing land respectively (Baber and Nieuwoudt, 1992).

Land tenure reform within the existing less developed African farming areas will not address fundamental black grievances about land inequality. However, any national land reform programme which takes land out of commercial production under formal private tenure, and redistributes it under a tenure system which does not facilitate economic interaction or the internalisation of externalities to the same degree, will reduce the level of

agricultural production and conservation on this land. Justice will consequently require a limit to such transfers, firstly because of the negative impact on the price of food, and secondly because of the injustice to future generations due to the degradation of the natural resource base. This point will clearly be reached sooner in situations where the constraints to agricultural production and conservation are greater. The implication is that reforms which reduce the level of transaction costs associated with the utilisation and transfer of land in these areas should be seen as a corollary to addressing the land issue at the broader level. It also follows that land tenure reforms which facilitate the productive and sustainable use of agricultural land in the existing African farming areas are just and right.

The need for property institutions to be efficient, that is, responsive to the specific needs and resource constraints faced at the community level, means that formal private tenure, despite its theoretical advantages, should not be centrally imposed on communities or individuals. Reforms which increase the expected level of returns per unit of agricultural production will, however, facilitate the transition to formal private tenure : there is a reciprocal relationship between economic development and the market for rights which reduce transaction costs. In situations where formal private tenure is not the optimal set of property rights, alternative reforms which increase the information provided by informal tenure systems should be initiated. The need is to facilitate the emergence of farmers in a position to utilise South Africa's limited area of agricultural land in a productive and sustainable manner.

3.6 Promoting conservation of natural resources

The challenge is to create a situation in which a steadily growing number of land users become sufficiently motivated to apply conservation measures in their fields. The initial successful application of these measures by a small number of farmers should stimulate other farmers to copy them. In this way, adoption can be accelerated considerably, creating a promising multiplier effect. From the perspective of adoption of techniques and maintenance of conservation works, it is preferable that large numbers of land users treat half a hectare each over a number of years, than that heavy machinery be relied upon to construct conservation works on the same area of land in a shorter period. The voluntary construction of conservation works by hand automatically matches maintenance requirements and the local capacity to carry out maintenance

Many conservation activities require a major labour input. This is the case in projects involved in construction of conservation works as well as in projects promoting the planting of vegetative barriers (for example, vetiver grass). As voluntary participation has been difficult to achieve, conservation planners have been quick to compromise and pay villagers for soil conservation labour with food or with a combination of food and cash. In this way, bottlenecks in motivation can be bypassed and physical

targets achieved. Indeed, it is sometimes argued that conditions are so severe that an element of relief assistance is justifiable in soil conservation projects : that the people who have not migrated cannot survive without subsidy while they conserve rapidly eroding land resources. But practice shows that if land users are given any form of payment by government to conserve their land and water, they tend to assume that government will also be responsible for maintenance of what has been constructed, either by paying them or by undertaking maintenance itself. They regard themselves as labourers rather than as participants.

These arguments do not mean that the use of incentives or subsidies for soil and water conservation should be wholly discarded. A useful distinction in deciding on the use of incentives is that between conservation by individual land users on their own lands, and conservation activities undertaken by villagers on communal lands. In the case of individually used land, farmers could be supported with training, which can act as a stimulant in itself, and small equipment in order to improve the quality of their work and to facilitate as well as accelerate the rate of construction. In the case of collective conservation of communal land, food aid could be provided in years of serious food shortages; in years of food self sufficiency, food aid could be replaced by other incentives in the form of community infrastructure, for example, a borehole and pump or a village health clinic, or in the form of tools, fertilisers, etc (that is, production oriented aid).

9 NATURAL CAPITAL AUGMENTATION

Two examples of land use systems that can be used to augment natural capital are considered here, namely, agroforestry and wildlife ranching (Erskine, 1992c).

9.1 Agroforestry

Widespread efforts are being made in many underdeveloped countries to encourage tree planting on non-forest lands. The experience in some of these countries suggests that farmers are not usually interested in developing communal lands for fodder and fuelwood production, but are looking for an opportunity to generate additional cash income without making heavy investment. Agroforestry appears to be a form of land use that can provide a real incentive to encourage farmers to plant trees (because of the multiple benefits and the early returns from one or more components of the system) while at the same time it serves to augment natural capital. One of the major challenges for agroforestry development is the dissemination of appropriate extension information which, in turn, requires research support (Hedge, 1991).

9.2 Wildlife ranching

In some countries in southern Africa, Botswana for example, livestock ownership is directly encouraged by government policies which provide fiscal incentives to overstock. Many inputs are

subsidised, as with veterinary fences and veterinary services in general. Extension and research services are provided by the government, as are slaughterhouse facilities. A critical factor is the ability to write off losses in agriculture against income from other activities, so that there is no incentive to manage herds to maximise pre-tax gains. The pricing system has also encouraged overstocking.

The tribal grazing lands policy was aimed at controlling overgrazing in the tribal lands. It set up fenced leasehold ranches on the lands, designed to absorb the large herds. However, commercial ranching is not suited to the tribal areas in Botswana. Wildlife has been 'squeezed out' by the expansion of cattle lands, wildlife migrations have been impaired by fences, and the benefits of the livestock development projects have accrued mainly to the wealthy. There is uncertainty about what to do to overcome the problem. Undoubtedly there is conflict between wildlife and cattle, and this raises the issue of the extent to which wildlife management can substitute for cattle ranching. Various estimates exist to show that some forms of wildlife ranching can yield economic rates of return above those achieved by cattle ranching, but these assume no fiscal incentives for cattle ranching such as exist at the moment (Pearce et al, 1990). Paradoxically, international aid agencies have been largely responsible for setting in place the incentives for increased cattle ranching in Botswana.

10 WOMEN IN DEVELOPMENT

Over the past two decades much research has documented how women are ignored, marginalised, or even harmed by development activities in Africa. Most development activities continue as if this information did not exist. The major issues for women include their mobility; access to material resources and common property; cash and income; women's groups, labour and time, education, training and extension needs. Women can define their own problems and implement solutions, but they may need information and support.

11 CONCLUSIONS

It has been emphasised in this paper that to promote sustainable use of natural capital, and sustainable development in general, there is a need for poverty to be reduced and for real incentives to be introduced to curb population growth and destructive use of natural capital (particularly on the commons). To achieve these goals, structural and functional changes (including the introduction of a participatory approach to the formulation of rural development policies and land tenure reform) in the system are required; economic diversity must come from rural industrialisation to reduce the dependence upon exploitation of natural capital to satisfy basic needs.

The high level of dependence on natural resources in South Africa is sufficient to justify a resource conservation policy in both the developed and developing areas of the country. It is likely

that mining will decrease in importance which means that the balance of the economy has to give increased attention to manufacturing, expansion of services and agriculture (small-scale as well as large-scale). This diversification of the economy is consistent with the principle of sustainable development since reliance on a single, dominant activity subjects the economy to exogenous risks (for example, world price variations).

It is appropriate to conclude by recording some realities concerning common property (Netting, 1992) :

- * As agricultural resources become increasingly scarce, due to population pressure and market demand, both private property and common property will become more institutionally elaborated and jurally defined.
- * The termination of common property rights, either by the community members agreeing to privatise their joint holdings, or an external legal and/or political authority enclosing the commons, will result in inequality and a decrease in mobility.
- * In future, intensive smallholder farmers in dense rural populations will have to compensate for their lack of resources by permanent, sustainable land use with complex tillage, manuring, intercropping, gardening, arboriculture, stall feeding of livestock, irrigation, terracing, and other methods of conserving and restoring the productive capacity of the soil.
- * In most developed countries, private rights to permanently productive land, including long term use, management, inheritance, and temporary or permanent alienation, are asserted and defended. The social unit that occupies the smallholding, providing labour and management, using the produce for subsistence and sale, and administering and transmitting rights, is typically a family household.
- * Common property among smallholders is not necessarily a precursor to private property nor is it functionally unconnected. Indeed, as the use of scarce land and water is intensified, so resources from the commons become more vital and increasingly subject to regulation.
- * There is inequality among smallholders, both in regard to their transferable and heritable private property and, less obviously, in their access to common property resources including communal labour.
- * Involvement of outsiders in utilising/managing the commons is undesirable. Outsiders, absentee landlords, and urban entrepreneurs are not subject to the social controls of rural community life, and they can ignore restrictions on resource exploitation and short term maximisation.
- * If rights in the commons can be acquired without local kin ties, residence, formal admission to the community, fulfilling labour and official service obligations, and participation in the assembly, then membership is shorn of its responsibilities and its constraints. Common property is not a joint stock company, with limited liability. membership does have its obligations as well as its privileges.
- * In answer to the question "Are commoners equal or not?", it

can be stated that households with more private property will derive greater benefits from some productive uses of the commons.

Common property institutions are as diverse as private property institutions. Common property institutions closely tied to local resource use will be defined and developed in parallel and symbiotically with private property. Defence of the commons against outsiders, investment of labour and money in the resources, and monitoring against excessive use and free-riding requires a responsible corporate group of interdependent rich and poor members. Privatising or enclosing the commons, either by agreement of the commoners or external force, tends to widen existing economic and political inequality among smallholders and to impede the solution of collective action problems.

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