POLICY REFORM AND NATURAL RESOURCE MANAGEMENT

WEEK 1: DAY 2

ENVIRONMENTAL CONSERVATION AND NATURAL RESOURCE MANAGEMENT: IMPLICATIONS FOR LIVELIHOOD SECURITY AND POVERTY ALLEVIATION

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INTRODUCTION

As the theme of this paper suggests, sustainable development includes a number of interdependent variables, including environmental, social, economic, and natural resources. The unifying theme of sustainable development was central to the Rio Declaration signed by 178 countries at the United Nations Conference on Environment and Development held in Brazil in 1992. A number of key policy statements made at the Conference referred to poverty eradication as an essential requirement for sustainable development; environmental protection constitutes an essential component of sustainable development; and the significant role of women in resource conservation and management should be recognised. Environmentally sustainable development (ESD) thus becomes a fundamental tenet to all development processes. Human beings are a central concern of ESD, with human development ultimately the priority. Sustainable human development is then defined by UNDP as “development that not only generates economic growth but distributes its benefits equitably: that regenerates the environment instead of destroying it; that empowers people rather than marginalising them. It is development that gives priority to the poor, that enlarges their choices and opportunities and that provides for their participation in events and decisions that shape their lives” (United Nations Development Programme, 1994).

Agenda 21, the Programme of Action of the Conference, calls for countries to formulate and adopt national strategies for sustainable development and to achieve the institutional and resource-based changes for long-term development. Conversely, it has also to be noted that environmental mismanagement at local and national levels can have negative consequences, which are inconsistent with sustainable approaches to development.

The objective of this paper is to explore the relationships between environmental conservation and natural resource management, particularly in terms of the impact on rural livelihood security and poverty alleviation. This will be achieved by means of a detailed analysis of the issues and relationships pertaining to these particular topics. The issues underpinning these relationships are developed in Section 2, where the discussion relating to the main themes of the environment, natural resource conservation and rural livelihoods are outlined. Section 3 explores specific factors that could contribute to environmental degradation and livelihood vulnerability, namely: national policy, population, technologies, land issues, and livestock. Strategies for natural resource conservation in relation to sustainable rural livelihoods are discussed in Section 4. A more detailed analysis of the sectoral implications of conservation and natural resource management, in relation to crops, livestock, forestry and fisheries, is undertaken in Section 5. The institutional context of the state and civil society in combating environmental degradation is complemented by reference to international conventions. The final section reviews the conclusions to be drawn in terms of resource implications and resolving the dichotomies between resource conservation and management.

2. THE ISSUES

2.1. Poverty and Environmental Degradation

There is an acknowledged link between poverty and environmental degradation. It has also to be recognised, however, that in low income countries, where poverty is a pressing and urgent
issue, the need to feed the population after drought or floods, may take priority over longer term environmental concerns such as climate change or the loss of bio-diversity. Key natural resource related priority areas of concern to low income countries are desertification, water scarcity, and soil and water conservation issues. These are often localised to a particular area or zone.

Food security is an overwhelming preoccupation of the poor. The biological necessity of feeding one’s family and oneself, sometimes lead to an over-intensive use of the limited natural resources available to them. They are often forced to make trade-offs between immediate food needs and longer-term environmental sustainability, both in production and consumption. Their vulnerable human and economic condition often result in the immediate utilisation of common property capital available to them - mainly in the form of natural resources, which may be described as a coping strategy.

The vast majority of the rural poor live in marginal or degraded areas, as a result of which they may simultaneously be agents and victims of environmental degradation where exhausted or fragile soils are totally bereft of potential for agricultural use. However, one may not attribute to the poor an intrinsic propensity to degrade environmental resources. There is little evidence to suggest that the rural poor pursue negative environmental practices when they have security of tenure and a long-term relationship with the resources in question. Thus, while poverty may be an underlying cause of environmental degradation, it is also influenced by a complex web of institutional and policy factors. The broad ranges of factors that produce and reproduce poverty in rural areas also include their relationship with the environment.

Evidence suggests a clear linkage between poverty and environmental degradation and the poor are often the victims of this process. Weak purchasing power, land fragmentation and social institutions such as inheritance contribute to reducing the size and viability of holdings. Issues of resettlement, migrancy, appropriation and eviction often lead to the illegal occupation of marginal low potential land where survival overrides land, water and forest conservation. Poor people also live in areas where pollution and hazards of toxicity are greatest, with the associated health risks.

While there may be a positive correlation between poverty and environmental degradation, the converse proposition that all environmental degradation is caused by the poor would be fallacious. It is evident that climate change, generated by the ‘greenhouse effect’ of gas emissions in the atmosphere, the most important of which is carbon dioxide produced from the combustion of fossil fuels, atmospheric and water pollutants, deforestation and chemical toxicity are primarily attributable to large capital enterprises and the poor are helpless victims of these extractive and exploitative activities. Global warming as a result of carbon dioxide emissions is likely to eventually result in an increase in sea levels and a consequent flooding of low lying agricultural coastal zones where the poor are substantially exposed (World Commission on Environment and Development, 1987: p.172).

2.2. Livelihood Security and Ecologically Fragile Zones

Fragile ecosystems are closely associated with poverty and environmental degradation. Approximately 60 per cent of the world’s poor populations are to be found in fragile ecosystems and remote, ecologically vulnerable, rural areas. It has been estimated that 60 per
cent of poor people in Africa, 80 per cent in Latin America and 50 per cent in Asia live in these areas (IFAD, 1992).

The extent and characteristics of these areas threatens the livelihood security of their inhabiting populations (Jodha, 1992):

- 40 per cent of the earth’s surface is considered dryland, of which 70 per cent is already degraded or subject to heavy degradation
- hilly and mountainous zones cover 21 per cent of the earth land mass and exert considerable influence on other areas through watershed functions and climate patterns
- approximately 900 million of the world’s population live in dry zones and 10 per cent of the world’s population live in mountainous zones - though 40 per cent live in the watersheds below; serious ecological deterioration caused by deforestation, excessive cultivation and deforestation threatens the livelihoods of these populations
- the livelihood systems of the absolute poor in ecologically fragile areas, which depend upon profound indigenous knowledge of the ecosystem, are being threatened by the imbalance of natural resource use and the use of inappropriate technology
- land degradation and loss of vegetative cover have consequences in terms of loss of biodiversity and carbon exchange; the loss of vegetative cover in dry zones directly results in carbon depletion and the reduction in plant diversity
- environmental degradation has a disproportionately greater impact on women’s livelihoods, since women are more involved in harvesting common property sources such as wood and water and in livelihood food security.

2.3. Poverty, Environmental Degradation and Management

It has already been established that the spatial distribution of the world’s rural poor population is closely associated with ecologically degraded areas. Increasingly, extreme poverty is to be found in marginal lands. Based on the premise of this correlation, new strategies are required that integrate poverty alleviation and environmental management in marginal areas.

Increased awareness by rural people of their environment has led a change of mentality in relation to it. A growing consciousness that the fragile environment on which they depend for survival, is being over-exploited, has led to initiatives designed to rehabilitate it and to manage it sustainably. There is also a growing awareness of the environment as a common property resource in which people have a responsibility of stewardship. This has led to community-based organisations, associations and village councils taking up proactive positions in advocating conservation. An interesting example of this is the multi-donor Kidal Food and Income Security Programme in Northern Mali, supported by UNICEF, Islamic Development Bank and World Food Programme.

The Rio Conference (UNCED) Agenda 21, the global action programme for sustainable development, is a landmark in addressing the poverty-environment nexus. In Chapter 3 on combating poverty, specific long-term strategies are called for that integrate poverty eradication and sustainable management of the environment and Agenda 21 devotes two chapters to the special needs of fragile ecosystems.
2.4. Natural and Man-made Disasters

The number of people affected by humanitarian disasters has grown sharply in recent years. During the mid 1980s, approximately 50 million people were in need of assistance because of short term emergencies. By 1994, 272 million people lived in countries that faced food shortages, a high proportion of whom are internally displaced people (IDP) and refugees. The number of refugees has doubled every six years, reaching a total of 20 million in 1995, a large proportion of whom are to be found in Africa (IFAD, 1992).

The growth in the number of people requiring emergency or disaster-related assistance is attributable to climatic variables such as drought or floods (often referred to as the El Nino factor), or to complex emergencies as a result of conflict. Regional political crises have led to massive shifts of population at short notice and the establishment of refugee camps, the size of urban agglomerations, in rural areas.

It is widely recognised that sudden influxes of refugees or IDPs lead to the establishment of temporary makeshift dwellings, generally on marginal unoccupied land. The inability of the natural resource base to sustain such a density of population occupation is generally manifest in the denuding of vegetative cover in the area, depletion and often pollution of water resources, erosion or exhaustion of topsoil and problems of waste disposal. Overall, such population movements have a negative effect on the environment.

Initiatives to address disaster-related factors tend to emphasise prevention, not just in terms of the immediate causes but looking at the underlying factors that contribute to such emergencies. It is necessary to go beyond relief assistance to examine longer-term entitlements and capacities, which may be translated differently in the context of food relief or complex emergencies. This will be based on the removal of food insecurity and personal insecurity among vulnerable households. A number of measures are proposed, which represent approaches to good governance and these include:

- participatory and effective governance
- involvement of civil society
- sustained and equitable economic growth
- investment in land-based activities, infrastructure and social protection
- disaster preparedness and mitigation strategies
- sound environmental policy and a quick response capacity to environmental disasters
- a grass root awareness of co-responsibility for natural resource conservation and management
- conflict prevention, reconciliation and post conflict reconstruction

2.5. Sustainability and Natural Resource Conservation

Sustainable development is defined by the World Commission on Environment and Development (1987) as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (p.8).

This definition of sustainability contains a number of key concepts relating to our understanding of sustainability in the context of environmental preservation and natural
resource management. The first refers to the concept of needs, how needs fulfilment are achieved in a form of inter-generational equity and how the scientific and social capacities to meet these needs both in the present and future are established.

Sustainable development is predicated upon a premise of meeting basic human needs of all and by inference of eradicating absolute poverty - a perspective which is further reinforced in the World Summit on Social Development (United Nations, 1995). Lessons from experience of focusing development efforts in a single-minded manner on meeting basic human needs in terms of food security, clean drinking water, housing, basic health services, education and jobs in a supply driven manner have shown the difficulties of maintaining high levels of recurrent expenditure and the interdependence between social expenditures and the levels of growth within the economy as a whole. Hence, the basic needs approach has been confronted by the dynamics of its own sustainability, but within the context of economic and administrative reforms that advocate enhancing economic growth and productivity, reducing public expenditures and social service delivery, within the context of cost sharing and market liberalisation.

The World Commission on Environment and Development (WCED) Report, otherwise known as the Brundtland Report, addresses equity also within generations (intra-generational) as well as between generations (inter-generational). It reflects a concern for rectifying imbalances between a skewed distribution pattern of resources between countries and within countries. The principle of intra-generational equity is addressed more specifically in the Rio Declaration’s definition of sustainable development “to equitably meet developmental and environmental needs of present and future generations”.

The concept of bequeathing a resource to succeeding generations implies also a conservation and preservation of capital by which the capital stock passed down must be at least as great as that inherited by the present generation. Here there are considerable variations between high income and low-income countries. High-income countries have, relatively speaking, already transformed their natural capital into industrialised and financial capital whereas low-income countries have retained their natural capital in terms of nature and habitats. This process raises a set of questions that are beyond the scope of this paper:

- What are the decision processes in government and in relation to civil society to determine whether a country’s natural capital should be conserved?
- How should risks affecting the irreversibility of processes be assessed?
- How should benefits be calculated in the decision process to convert natural capital into social or economic capital, e.g. investment decision regarding logging, which in turn affects loss of bio-diversity, natural habitats and climate change?

The second half of this section will discuss the use of sustainability indicators for natural resource conservation. Agenda 21 of the Rio Summit calls for indicators of sustainable development to be identified in order to “provide solid bases for decision-making at all levels”. The development of indicators will inevitably depend upon the nature of the specific location or project under study. In terms of natural resource conservation, a methodology is proposed below which will measure, by observation or landsat imaging, the level of natural resource conservation or degradation in a particular location. The conclusions of such observations have wider implications in terms of rural livelihoods and the linkage between
environmental degradation and the disintegration of natural resource-based livelihoods, with consequences for poverty alleviation.

The verification of ecological sustainability would require a time series study of a series of indicators using different historical reference points e.g., 1960, 1980, and 1998, in a longitudinal study of environmental change in relation to natural resources, production flows and management practices.

(i) **Natural Resources**
- soil erosion
- gully formation
- fertility level of land
- livestock holding per size of farm
- changes in herd structure
- area under forest, pasture, cropping
- level of vegetative cover
- reduced level of bio-diversity
- level of water sources
- increased human population
- new land under cultivation
- increased fragmentation of land
- reduced size of parcels
- increased distance to parcels from homestead
- levels of food self-sufficiency
- how many months of household food self-sufficiency

(ii) **Production Flows**
- declining level of crop yields
- declining level of livestock productivity
- changes in stocking practices
- level of fodder and animal feed from commons/private land
- reduced quantity of fertiliser application (organic/chemical) to crops
- increased inputs required to maintain former levels of production
- higher intensity of disease and pest infestation
- increased labour demands for same level of productivity
- breakdown of linkages between pastoral and agricultural systems
- increased buying-in of food-grains for household use
- increased time required to collect fuel-wood, fodder and drinking water

(iii) **Management Practices**
- changes in access to open grazing
- emphasis on mono-cropping or restricted choice
- increased steep slope cultivation
- increased depth of terracing
- reduced fallow
- increased conversion of marginal land
- reclamation of marshlands
The above indicators present a series of benchmarks against which environmental decline can be measured over time and in a specific location. It does, however, presuppose that a baseline study is undertaken at a particular time of the year and is updated at similar time intervals that permit comparison, say, at least every decade. Such data will then provide the basis against which an environmental audit may be drawn up and the impact of management practices assessed. It presents an important input to an understanding of sustainability.

3. FACTORS CONTRIBUTING TO ENVIRONMENTAL DEGRADATION AND LIVELIHOOD VULNERABILITY

Over the last 30 years it is estimated that the world has lost almost 20 per cent of its topsoil from cultivable areas, a similar level of rainforests and many thousands of plant and animal species. Deforestation and desertification are increasing; six to seven million hectares of agricultural land are taken out of production annually due to soil erosion and a further one and a half million are subject to salinisation, alkalisation and waterlogging. Desertification has taken place as the vegetative cover protecting the soil and retaining moisture has been depleted (IFAD, 1992). Approximately 11 million ha. of tropical forests are lost annually, mainly because of ranching, commercial logging and squatting by landless families. Deforestation can have significant impacts upon agricultural productivity. As fuel-woods disappear or are located at a great distance from users, alternative fuels such as animal dung are then used for energy purposes. This practice detracts from soil fertilisation and conservation of the biomass by undermining the symbiotic relationship that often exists between crop and livestock production systems at the household level (ibid.).

Human factors such as mismanagement of resources perhaps account for as much as 80 per cent of desertification worldwide (IFAD, 1992). It is also a significant factor in the 70 per cent of rangelands and arid lands which are moderately to severely desertified.

The rest of the section will address in a summary fashion key variables which have a negative impact on environmental sustainability outlined in the preceding section. It will examine the significance of environmental degradation and the social, political and ecological factors that contribute to it.

3.1. Linkages between Environmental Degradation and Livelihoods and Population Growth

Livelihoods are based upon a symmetrical relationship between people's consumption needs and production capabilities. The latter are composed of a number of factors that include access to basic entitlements, production assets of land, capital and social infrastructure, food and personal security and a stable political environment, free from conflict and ethnic discrimination. Social practices also contribute to over exploitation of land and water resources, particularly in terms of fragmentation of holdings as a result of some inheritance customs.

High population to land densities can have destabilising effects on the social environment in terms of competition for scarce resources, lowering of rural wage rates, over-valuation of assets which generates frustration and survival concerns. In turn, these can give rise to acute social tensions, ethnic unrest and a destabilised environment that is inimical to economic and
social progress and livelihood security. Some authors would argue, for example, that declining land availability as a result of population growth and environmental degradation were contributory factors to ethnic unrest in Rwanda (Prunier, 1995: p.4). There is an irrefutable negative correlation between population growth and land availability. However, while increased population pressures often in practice result in environmental degradation, the latter is not necessarily the final outcome and it is also dependent upon land-husbandry practices. A causal link between population growth, livelihood insecurity and environmental degradation is more difficult to establish in strict sequence as it is more of a “chicken-and-egg” situation, reflecting the difficulty of determining which comes first.

A survival strategy accompanying livelihood insecurity is to produce more children, as the flow of wealth is from children to parents in a subsistence society. Thus, fertility is a form of livelihood security. The skewed age structure which follows rapid population growth, increases pressure on land holdings, both in terms of size and intensity of use, which become particularly acute in areas of low agricultural potential. The high dependency ratio also contributes to low savings potential for land investment.

Sub-Saharan Africa is a particular locus of high population growth rates. There are 26 countries in which the annual rate of population growth exceeded 3 per cent over the period 1980-1987, which is mainly due to improved health and hygiene (United Nations, 1997).

3.2. Livestock Development

A combination of traditional practices of herd expansion in preference to herd quality and when compounded with poor management, places natural resources under strain. Similarly, small ruminants can be extremely damaging to plant and fodder resources. Extensive livestock keeping is putting rangeland under increasing pressure. Over stocking may be rationally explained by herders as an insurance against the high animal mortality rates that accompany droughts. At the same time, the carrying capacity of arid and semi-arid pasturelands has not been developed (IFAD, 1992: p.83) contributing to environmental degradation.

The cycle of resource degradation, livelihood insecurity and livestock raising can be broken by participation of the stockholders in devising strategies for grazing improvement, rangeland management and increased productivity per animal. These could be supported with technical packages, such as veterinary support services, animal health centres and prophylactic treatments for recurring diseases.

3.3. Land Issues

Inappropriate land management practices so as to achieve short-term gains are a major contributory factor to environmental degradation. Among these practices one could mention: large scale mechanisation, inappropriate use of chemical fertilisers and pesticides, denuding landscapes of vegetative cover, charcoal burning and slash-and-burn methods of agriculture where fallow periods are too short.

Land tenure factors also contribute to degradation when the people’s human and historical ties to the land are broken. The shorter and more insecure the lease, the more extractive will be the agricultural activity practised by the tenant. Ownership patterns are also significant:
common property resources are generally intensively used but weakly managed, and customary titles provide a level of security adequate to ensure permanent usufruct but may not be acceptable as collateral for credit. Individual land tenure, therefore, provides an opportunity for accessing investible resources in land development, which could enhance the environment by the adoption of a long-term development perspective.

3.4. National Policies and Institutions

Given the long gestation period of resource conservation investments and the short-term horizon of national planning and budgeting, natural resource investments are seldom allocated a priority expenditure rating. Recent economic reforms have emphasised export crops that can create distortions in land use and investment decisions. Resource intensive export crops that deplete marginal lands e.g., maize and tobacco, are often supported by subsidised financial incentives particularly for up-scaling to commercial level operations and can have adverse ecological consequences on land quality.

Another policy decision that has had detrimental environmental impact relates to compulsory villagisation or collectivisation. Regrouping of populations into central villages, either for security, economic or political reasons inevitably leads to the depletion of land and water resources in the vicinity of the new settlements. Current examples of this phenomenon are the regrouping of the civilian population into villages in Burundi and Rwanda, transmigration in Indonesia and, in the past, villagisation in Tanzania.

The operational consequences of fiscal regimes, in terms of incentives relating to resource depletion rather than resource conservation, raises the issue of how macro-economic policy impinges upon resource conservation. Distortions arising include: subsidies for tourist development, which is both land and water use intensive, emphasis on agricultural mechanisation, inflated building-land values that encourage conversion of agricultural land, and transportation policies that are land extensive.

Practical difficulties for poor farmers trying to survive in marginal areas include the time lag for natural resource investments to bear fruit, extended periods of fallow, the cost of which vulnerable groups are often unable to bear. The return on investment is subject to a long time horizon, beyond the immediate range of concern of the impoverished.

The dumping of toxic waste in low income countries, which originates in the industrialised world, is a practice with detrimental impact on environmental quality and public health. The taxing of all transgressors of environmental legislation on the “polluter-must-pay” principle is an issue requiring urgent legislative initiatives.

3.5. Technological Factors

Inhabitants of marginal areas, generally in arid and semi-arid agroclimatic zones, have an invaluable stock of indigenous technical knowledge on environmental constraints and coping strategies acquired over many generations. However, the circumstances in which this knowledge has been developed have evolved considerably over the last generation. Increases in population, conflicts, declining fertility, green revolution technology, cropping patterns, and environmental degradation have radically changed the parameters within which smallholder agriculture has been carried out.
Resource-poor farmers, working on marginal dryland smallholdings, are highly dependent upon natural resource conservation and balanced management of these resources. However, much of the technological innovation embodied in new varieties and increased yields have been in response to export-driven market demand, favoured large scale production techniques and is generally capital intensive. In order to preserve livelihoods of vulnerable smallholders in harmony with natural resource endowments and in the absence of new technology, there is a need to reassess traditional technologies that conserve natural resources and build upon the established coping strategies that communities have recourse to in times of emergencies. In the first instance this would imply an emphasis on locally available resources, improved husbandry techniques and minimal external inputs in production packages. In particular, capacity strengthening of smallholders would enable them to incorporate an appropriate level of new knowledge, compatible with resource conservation, into existing production systems.

4. STRATEGIES FOR NATURAL RESOURCE CONSERVATION AND MANAGEMENT IN RURAL LIVELIHOODS

There are two basic positions in relation to the environment that are partially at odds with each other. Conserving the environment by natural growth, free of direct human interference, or managing natural resources within the context of human livelihoods, with a clear focus on maintaining sustainability and harvesting an appropriate level of output for human use. While both approaches are valid they may be applicable each in their own way to specific areas and activities e.g. tropical rainforests, preservation of endangered species and wildlife. The thrust of this section will be to study conservation strategies within the context of resource management to improve and sustain human livelihoods.

4.1. Resource Conservation Management and Poverty

The key points emerging from the World Summit for Social Development (United Nations, 1995) are: a close linkage between protecting traditional land rights; strengthening land management in the areas of pastoral and nomadic activity; building on traditional communal practices; and protecting communities from encroachment. This rational approach to conservation is then related to protecting human livelihoods and reducing poverty through developing improved systems of range management, consolidating access to water, and production factors such as credit, health services, education and technical advice. Particular emphasis is placed on traditional forms of sustainable agriculture and animal husbandry in environmentally fragile areas.

It has been argued above that poverty can lead to ecological deterioration and a desperate over-exploitation of the natural resource base. The imperative of human survival force populations to denude forests, exhaust soil fertility in crowded areas and steep slopes, thus triggering a spiral of mutually reinforcing poverty and environmental deterioration.

Initiatives to break the vicious cycle of poverty and ecological deterioration include policy initiatives supported by an incentive framework to encourage environmentally friendly investments, popular participation in the analysis of problem and solutions including traditional knowledge. At the level of physical initiatives, possible solutions include: soil and water conservation measures, water harvesting, organic biomass production, low cost
biological measures such as bunding, grassing and contouring, rangeland management control strategies and afforestation.

4.2. Policy Initiatives by the State and Civil Society to Protect the Environment

Land Rights. Land tenure has been discussed above, but it is imperative that an appropriate land rights legislation be included in the enabling framework required to ensure that natural resources are adequately protected from speculation and capital development. The legislative framework should also include provisions on inheritance, cadastral surveys, women’s ownership rights, and land zoning for agricultural, commercial, forest rangeland and settlement uses. A widespread consultative process that incorporates the best of customary law, particularly, those that affect common property resources, would ensure a strong civil society participation.

Gender Aspects to Environmental Protection. In many traditional societies women have a frontline management relationship with land, water resources, fuelwood and small livestock. This experience is therefore critical to the success of arresting environmental degradation. Concrete initiatives should be taken to ensure that women are involved in local policy making that affect the environment. Initiatives must be taken to ensure that more energy-efficient systems for cooking are developed, advice and technology are made available and tasks of drudgery are systematically eliminated from the labour schedule.

Civil Society Collaboration. Isolated initiatives have little impact in a sustainable manner on environmental conservation. Therefore, a broad coalition of civil society organisations and parastatal institutions such as local government environmental sub-committees, is necessary in order to involve civil society in public action initiatives to develop policies and undertake programmes in resource conservation, in collaboration with government. Non-governmental organisations (NGOs), particularly those dedicated to conservation, are particularly effective in lobbying government and creating public awareness of conservation and natural resource management issues among the community of citizens. NGOs are also effective in promoting training of local communities with respect to understanding environmental issues and local organisational skills.

Natural Resource Conservation in the Project Planning Cycle. In developing the project planning cycle from identification through to evaluation, best contemporary practice suggests the incorporation of an Environmental Impact Assessment (EIA) at the appraisal stage. However, at appraisal, the feasibility study would already have been substantially developed, parameters would have been decided upon and the investment flows have been projected. It would therefore be advisable that a thorough impact study on natural resource development, conservation and environmental impact be undertaken at the formulation or preparation stage. The issue of calculating costs and benefits in environmental projects is a hotly debated point among environmental economists.

5. A FRAMEWORK FOR ANALYSING SUSTAINABLE RURAL LIVELIHOODS AS A STRATEGY FOR RESOURCE CONSERVATION

Sustainable rural livelihoods have a number of basic elements, which, in a historical situation, combine in particular mixes to form a livelihood strategy (agricultural intensification/
diversification) to achieve a sustainable livelihood outcome. This could include poverty reduction, improved well-being, ensured sustainability of natural resource base and enhanced livelihood resilience (Scoones, 1998). A key function in the assessment of livelihood resources (natural, social, and socio-economic capital) is to analyse the renewable natural resource base of crop production, fisheries and forestry in function of stakeholders, poverty reduction, social capital and gender (ODA, 1996). This, in turn, will lead to socially responsible activities appropriate to natural resource conservation and sustainable livelihoods.

In the following sections, a list of activities related to stakeholder analysis, poverty reduction, enhancing social capital and gender implications will be applied to the natural resource sectors of crop production, fisheries and livestock so as to establish an operational framework for a productive partnership between resource conservation and sustainable rural livelihoods.

Sustainable agriculture may be described as encompassing a range of cropping systems, livestock, agro-forestry, and fisheries systems that maintain or increase the productivity of the natural resource base, including land, water, plants and animals (see ODA, 1996). This section will address a series of issues that need to be studied in this respect, based on stakeholder analysis, poverty reduction and livelihoods, enhancing social capital, gender implications and suggested activities.

5.1. Crops and Livestock

Stakeholder Analysis
- establish the livelihood significance of crops and livestock among the population;
- determine the distribution of crop production, landholdings and livestock;
- assess food security parameters;
- study role of livestock in social relations; and
- identify adverse environmental impacts.

Poverty Reduction and Livelihoods
- establish profile of the poor based on land and animal ownership patterns;
- identify causes of decline in the resource base in terms of quality, productivity or resource degradation;
- propose remedial measures to address the causes of decline: immediate causes and underlying or structural causes;
- assess the levels of benefits of interventions reaching poor people directly, in terms of factors of production, e.g. employment, access to credit, land availability;
- examine the applicability and suitability of the technology used to the capacities of smallholders, both women and men and special needs of the illiterate; and
- ensure that the production of the project actually meets the consumption requirements of the poor in terms of food security, enhanced nutrition and purchasing capacity.

Enhancing Social Capital in a Sustainable Manner
- assess the institutional framework of support organisations for the delivery system: i.e. research, extension, advice, inputs, technology and their coverage of the most vulnerable groups;
– analyse the institutional effectiveness of civil society organisations, e.g. NGOs, farmers
associations, churches, in reaching their constituencies and participating in the planning
and management of activities;
– undertake a social needs study through participatory methods, of the impact of livestock
and crop production systems on health, education and social well being; identify
constraints, opportunities and risks; and
– strengthen the production base of community associations to ensure on-farm adaptive
research, improved yields and higher returns to producers through better storage and
marketing.

Gender Implications
– recognise the critical production role of women in agricultural and livestock systems and
adopt extension systems, communications and demonstrations in consequence;
– promote female extension workers who can address the specific needs of women
producers of crops and livestock;
– address the principal constraints perceived by women farmers in production, marketing
and value added activities of livestock and crop production; and
– assess how new production systems will affect intra-household resource and income
distribution while recognising the wider distribution effects of female incomes within the
household.

Suggested Activities
– ensure a policy environment that adopts a balanced approach to sustainable production and
conservation and encourages private sector and civil society participation and involvement
in input supply, research and marketing;
– strengthen institutional capacities and involvement in each stage of the crop and animal
production cycles to ensure sustainable management of the renewable natural resource
base and technology transfer; and
– develop technological packages in both crops and livestock promoting sustainable use,
conservation or the management of the natural resource base and appropriate to poverty-
affected populations.

5.2. Forestry and Agro-Forestry

Sustainable forest management policy implies both the conservation of strategic forests in
scarce supply or declining species, particularly hardwoods and functional forests that provide
a supply of wood and forest products for use by humankind. The benefits of sustainable
forest management include fuel-wood for domestic purposes, cattle fodder, and medicines.
Forests also protect the soil from erosion, prevent environmental degradation, act as a store of
plant bio-diversity and carbon, provide vegetative cover and contribute to climatic stability.

Stakeholder Analysis
– assess how forests fit in with the survival strategies and livelihood systems of the poor;
– identify the major stakeholders in terms of commercial interests of forest exploitation and
the legislative framework affecting reserves, extractions and species controls;
– clarify the permit issuance procedures;
– verify the status of illegal settlements on forest land, the causes of displacement and
resettlement packages;
− map out the conflicting claims and demands relating to forest conservation and management by primary and secondary stakeholders: illegal settlers, peripheral populations, wildlife preservation interests, commercial logging companies, livestock grazing groups, farmers wishing to extend cultivation areas, road-builders and government departments representing various production and conservation interests; and
− determine areas of conflict and initiate consensus building.

**Poverty Analysis and Livelihoods**
− has a participatory poverty assessment (PPA) been carried out relating to the role of forests in the livelihood systems of the poor?
− how will any proposed development initiative impact upon poor forest users and forest dwellers?
− assess compatibility between fuel-wood requirements of the poor and supply of suitable species for same;
− study the impact of the gestation period of forest growth on low income users;
− identify ways in which forests support the livelihoods of the poor in terms of soil regeneration, animal fodder, implication for slash and burn methods of shifting cultivation and income opportunities; and
− analyse how the poor will benefit and how they may lose in the event of forest development.

**Enhancing Social Capital in a Sustainable Manner**
− ascertain how local communities, and marginalised groups in particular, will participate in the policies and plans affecting forest conservation and management in their areas, in terms of species choices, harvesting arrangements of new species and existing growth, extraction proposals, rights of access and monitoring;
− suggest ways in which social services may be delivered to isolated forest communities
− identify skills associated with the development and marketing of forest products by local communities and particularly the underemployed youth e.g. beekeeping; and
− anticipate an equitable distribution and boundaries of power between forest dwellers, government departments, forest rangers and interest groups mentioned earlier.

**Gender Implications**
− assess impact on women in terms of their continued access to firewood, fodder and forest products for household consumption;
− ensure that in tree planting projects, the available seedlings and saplings conform to the needs of women in terms of species and domestic needs; and
− promote gender awareness in Forest Department staff.

**Direct Activities relating to Sustainable Forest Conservation and Management**
− develop national policies for forest conservation and development to include forest inventory and bio-diversity studies, land use planning, effective regulations and consultation fora;
− provide an incentive-driven regulatory framework for sustainable forest management, which involves stakeholders, especially local communities, living close to or within the designated forest area;
− promote institutional development of local associations with responsibility for sustainable forest management, including local communities, NGOs, local government and other intervening organisations; and
− ensure that practical steps are taken to promote reforestation, agro-forestry, control of forest burning and slash and burn cultivation practices, and sustainable levels of extraction of forest products.

5.3. Fisheries

Fisheries form a very diverse sub-sector and the environmental dimensions relate closely to the type of activity undertaken. For example, aquaculture on farmlands, inland lake, river fisheries, coastal fisheries or mariculture. Furthermore, fishery activities may have as their objective stock conservation or harvesting and in this respect the species of fish caught, their size and stock replacement are all extremely relevant. Furthermore, for many riverine, coastal and lacustrine dwellers, fish constitutes a major source of nutritional intake and food security systems, particularly for low-income groups.

Stakeholder Analysis
− ensure that the fisheries activity fits in with the interests, customary practices, capacity and needs of the local fishing communities, including food security and nutritional diet;
− verify that the interests of the community are not compromised by powerful outside interests of a national or international character; and
− assess the technology proposed to ensure that it is compatible with conservation of fish stock, is accessible to traditional fisherfolk and respects international conventions on sizes of fish caught, volume of catches and mesh sizes.

Poverty Analysis and Livelihoods
− ensure that low income groups are not adversely affected by the fisheries investment in terms of income, employment, traditional fishing rights, stock levels and nutrition;
− assess the affordability of any new technology and whether accessible and suitable credit arrangements are in place to ensure that poor households are not excluded because of capital or collateral constraints and that activities will be sustainable;
− analyse the spread of risk and benefits accruing to fishermen and marketing companies to ensure that there is an equitable distribution of benefits;
− protect the interests of artisan fishermen who are vulnerable to monopoly purchasers of a highly perishable commodity; and
− ensure that mechanisms are in place to reduce risk exposure of weather, catch uncertainties, seasonal labour fluctuations.

Enhancing Social Capital in a Sustainable Manner
− assess the resilience and corporate creditworthiness of fisheries cooperatives, their membership composition and influence of fishermen in their activities;
− assess the provision of health facilities for illnesses related to fishing environments, e.g. malaria, bilharzia and particular pollution risks associated with aquaculture;
− ensure educational provision exists in terms of extension advice for fisherfolk, both women and men, and schools for children; and
− assess the availability of land for food production.

Gender Implications
− carry out a labour profile of fishing activities and ascertain the role of women in the production process; verify whether women, as a group, are structurally disadvantaged;
− review the distribution of benefits from the project to ensure equitable intra-household income distribution between women and men; and
− make provisions for women’s reproductive health when living in remote fishing communities.

Direct Activities for Sustainable Fisheries
− policy formulation at national and local levels that ensure that fishing activities are conducted within a clear legislative framework that protects fishing stocks from over-exploitation and extinction;
− plan human resource development programmes to ensure that local fishermen can access technology transfer and improvement, have supportive business advisory service and financial services;
− ensure that international fishery concessions do not exhaust or severely deplete fish resources; and
− identify, promote and advocate adoption of technologies to sustain the wider riverine, lacustrine or marine environment.

6. INSTITUTIONAL CONTEXT OF RESOURCE CONSERVATION

So far, we have examined natural resources and livelihood strategies in relation to the achievement of conservation outcomes. However, the processes by which these outcomes are achieved are mediated through institutions and organisational structures. It is therefore important to understand these processes particularly as institutions act as ‘gatekeepers’ to livelihood resources, provide insight to the social processes underpinning livelihood sustainability and often explain the shifting coalitions between formal and informal institutions.

It is possible to identify six groups of institutions involved in resource conservation to varying degrees. These are government organisations at both central and local levels, non-governmental organisations, civil society organisations, aid organisations, private sector and academic institutions. All groups are important in the function they perform, either as part of the problem or of the solution.

In an Asian case study, which includes the Philippines, Indonesia, Thailand, Bangladesh, Nepal, India and Sri Lanka and dealt specifically with resource conservation and management, the following conclusions were reached (Samad, Watanabe, and Kim, 1995: pp.259-274):

− biomass quantity and quality is fundamental to sustainable rural development;
− biodiversity should be sustainable for future generations and this has implications for the management of land and water resources and human health; and
− management of renewable natural resources should be “ecologically viable, economically rewarding and socially acceptable” (ibid., p.259) before peoples participation can be ensured.

Based on these assumptions, the following guidelines emerge as fundamental to institutional provision for sustained resource management:
- local control or autonomy is essential to sustained resource conservation and sustainable management of resources.

- equity: people should benefit equitably from the benefits of development, particularly the poor and marginalised.

- inclusive: all stakeholders should be involved in order to prevent conflict and the thwarting of sustainable management.

- holistic: organic linkages between sub-ecosystems and between people and nature and the diversity of these relationships should be accepted.

- transparency: public accountability is fundamental to continuing trust and confidence in local institutions; misappropriation of communal funds or reneging on promises undermines their trust.

6.1. Role of the State and Civil Society in Combating Environmental Degradation

Threat to Social Fabric. Environmental degradation leads to a dislocation of people away from exhausted soils in drylands and mountain areas to relatively better off rural areas and urban centres and even to international migration. In these areas the cycle of resource depletion may then be repeated, eventually leading to political and social instability, with the potential to perpetuate poverty. Other contributory factors to resource depletion go beyond the population flows of marginalised peoples. They include careless management of irrigation systems, pollution, and illegal dumping of toxic waste that leads chemical infiltration of the water table (e.g. arsenic in Bangladesh).

Role of the State. The government of the country has the ultimate responsibility of drawing up a comprehensive legislative framework to promote environmental conservation and preserve natural resources from misappropriation and misuse. More often than not, national legislation alienate communities from their natural resource base but fail to control the misuse of the resources, as the instruments of control e.g. licensing, permits, planning consents, are open to patronage or corruption. It is also often the case that the legislature may be composed of individuals who retain a commercial interest in maintaining a laissez-faire attitude to environmental preservation. Existing hierarchies of executing government agencies often preclude people's participation and the policy environment does not give due recognition to resource management capability of local communities. Disabling policies can also undermine local initiatives.

Policy Framework for the Operationalisation of State and Civil Society Action for Sustainable Development. It has become evident that a compact is essential between the State, which provides an enabling policy environment and civil society, which becomes involved as a primary stakeholder in sustainable development. Policies therefore should be people friendly and induce supportive participation in mutually beneficial care of the environment. This often requires education and awareness both by government and civil society.

The following suggestions are given, drawn on best practice, as possible elements in the collaborative state-civil society partnership and people’s empowerment:

- decentralisation of decision making to the lowest level in order to legislatively empower local control and autonomy;
− central legislative framework that is pro-people and pro-environment and validates civil society’s involvement in resource conservation and management;
− partnerships between government and civil society organisations or between various non-governmental organisations;
− training of people in organisation techniques and environmental issues so as to expand capabilities;
− development of technologies appropriate to local conditions; and
− area-based approach consistent with the capabilities of the people's organisations concerned, such as micro-watersheds, villages or agro-ecological zones.

Role of Traditional Communities. Some traditional communities have developed, over many generations, complex systems of sustainable natural resource management that have stood the test of time. Examples of these are water-harvesting techniques in Somalia, bunding in West Africa, and irrigation systems in North Africa. These proven practices have much to offer in addressing contemporary concerns over long term resource sustainability. In asserting the importance of local knowledge, the case for the involvement of peoples organisations, in partnership with central authorities, has been argued above. Furthermore, the cultural and ecological heterogeneity of people and locations underline the need for decentralised, local level decision-making capabilities.

6.2. International Conventions to Combat Environmental Degradation

Environmental degradation as an issue was used as early as 1950 by UNESCO under the rubric of desertification, but quickly forgotten. Finally, the World Commission on Environment and Development (WCED), an independent commission, chaired by Gro Harlem Brundtland, former Prime Minister of Norway, was set up by General Assembly of the United Nations in 1983. Its major purpose is to propose long term environmental strategies for achieving sustainable development by the year 2000 and beyond, taking account of the interrelationship between people, resources, environment and development. The links between poverty, inequality and environmental degradation formed a major theme, based upon economic growth that was socially and environmentally sustainable. This commission laid the basis of the Rio Summit.

The Rio Summit, in Agenda 21, calls for indicators of sustainable development to be identified “to provide solid bases for decision-making at all levels”. It is acknowledged that while indicators for the strategic level are widely available, project or local level indicators are more problematic. This challenge, however, to localise the impact of environmental assessments to project and area specific dimensions, is a key development in Agenda 21. The awareness generated also made possible the adoption of the United Nations Convention to combat desertification. The convention calls for local action by donors and governments through partnerships with local populations to effectively combat desertification. There is an International NGO Network on Desertification to exchange information and experiences and to enhance the capacity of civil society organisations in implementing the Convention, which though signed by 105 countries has only been, so far, ratified by five.

Another environmental concern, which was brought into prominence as a result of Agenda 21, was fragile ecosystems and sustainable mountain development (Chapter 13). A World Conference on Sustainable Mountain Development was held early in 1997 and drew up conventions that focused on poverty eradication, information networks, and integrated
national mountain development programmes. Mountains are important sources of water, energy, minerals, and agricultural products and provide a habitat rich in bio-diversity.

7. CONCLUSIONS

7.1. Resource Implications of Conservation Strategies

The decision to conserve the production environment and to defer or reduce resource consumption comes at a cost. Neither national budgets nor international financial flows give clear information on the aggregate level of resources allocated to resource conservation or management or anti-desertification. Some resources are provided under the Global Environmental Facility (GEF), which enables low income countries to access financial resources in order to undertake environmental measure to reduce pollution, particularly emission levels of greenhouse gases, and to protect the ozone layer.

However, the critical feature of environmental investments is the long gestation period before benefits come on stream and the risks involved, given the futuristic assumptions upon which favourable outcomes are predicated. This would suggest that international financing of environmental activities should be on a grant rather than a loan basis, given the temporary moratorium on the use of factors of production implied in the resource conservation decision and the cost of alternative livelihood-sustaining actions. In this respect, given the powerful poverty-environment nexus, and the convergence of the two central development themes of the latter part of the 20th century within a global context, the availability of funding for resource conservation and management must emerge as top priority for the international community, alongside poverty eradication.

However, environmental considerations are a cross-cutting concern and form an integral part of all investment decisions. Therefore, regular mainstream financing should also address the environmental dimension of every investment, which in turn would be subject to a light or full-blown EIA study, depending on the overall impact of the project upon the environment.

7.2. Resolving the Dichotomy: Resource Conservation vs. Management

In a way this is a false dichotomy as all natural resources require sound management and, as earlier discussions indicated, a level of conservation to preserve inter-generational equity. The debate focuses on the degree of present consumption and offtakes implied in management. There are no universal principles in this respect apart from the general consideration implied in sustainable development to “meet the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). Practical day to day decisions have to reconcile the survival consumption needs of a massively poor population against resource conservation. For example, is game poaching reprehensible for starving populations living close to game reserves being preserved for tourists?

A rational analysis of offtakes or harvesting that would not jeopardise future productivity may have to be undertaken. These kinds of decisions could apply to forest management, stocking and destocking livestock herds, crop rotational systems, flora and fauna management, watershed development, and fishery projects. The involvement of beneficiaries and
stakeholders in these decisions would be an essential condition of their success, as the future resource would be a critical element in awareness-raising and communal commitment to the venture.

The community dimension to sustainable resource management/conservation, as applied to the various sectors, would be in the form of participatory governance involving local communities and their partners, NGOs and others. In order to preserve the confidence of all stakeholders, donors, governments and civil society, it is important to ensure full transparency, accountability and accessibility of management. Community level investment would create the catalyst for community shareholding and partnership and lead to durable economic and environmental assets to be shared collectively, while effectively addressing poverty reduction. A poverty reducing environmental policy, which addresses current needs and preserves future assets is perhaps the ‘Holy Grail’ of sustainable development.

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