POVERTY AND THE ENVIRONMENT: MEASURING THE LINKS

A Study of Poverty-Environment Indicators with Case Studies from Nepal, Nicaragua and Uganda

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ABBREVIATIONS

CAS Country Assistance Strategy (of the World Bank)

CPR common property resource

DAC Development Assistance Committee

DALY disability-adjusted life year

HIPC Highly Indebted Poor Country

IDA International Development Assistance

IMF International Monetary Fund

INEC National Institute of Statistics and Censuses, Nicaragua

NLSS Nepal Living Standards Survey

NSSD national strategy for sustainable development

NTFP non-timber forest products

PA poverty assessment

PEAP Poverty Eradication Action Plan (Uganda)

PMAU Poverty Monitoring and Analysis Unit, Ministry of Finance, Uganda

PPA participatory poverty assessment

PRA participatory rural appraisal

PRSP Poverty Reduction Strategy Paper

SLF Sustainable Livelihoods Framework

TSP Target Strategy Paper (DFID)

There have been numerous initiatives to develop indicators that track trends and developments in the state of the environment, and indicators that reflect on human development, particularly comparing trends between countries as well as over time. But human development and environmental issues have generally been looked at separately, and there is a need to develop indicators that reflect the relationships between them, particularly focusing on poverty and environment. This has been highlighted in the recent initiative of the World Bank/International Monetary Fund to promote the development of Poverty Reduction Strategy Papers (PRSPs) setting out the poverty profile of a country and key initiatives that will contribute towards poverty reduction. Many of the country PRSPs produced to date have not sufficiently considered environmental issues or recognised the linkages between poverty and the environment (SDU, 2000). Subsequently, associated poverty–environment indicators have not been generated.

This report sets out the key findings of a study conducted between September 2000 and April 2001 to develop and pilot test a set of generic poverty–environment indicators for potential use in PRSPs. The indicators were developed through a review of environmental issues of relevance to the poor, particularly drawing on findings from participatory poverty assessments. The draft indicators were then pilot tested in three countries: Uganda, Nepal and Nicaragua. These countries were selected as they either have produced – or are in the process of producing – a PRSP, and because they represent different geographical regions and conditions.

Developing Poverty–Environment Indicators

The development of generic indicators was informed by a review of:

- Environmental issues raised by the poor through participatory poverty assessments [taken from *Voices of the Poor* (World Bank, 2000a), which reviewed nearly 100 participatory poverty assessments (PPAs) from around the world].
- Other sources of information on environmental issues of relevance to the poor, including the Target Strategy Paper *Achieving Sustainability: Poverty Elimination and the Environment* (DFID, 2000a).
- Relevant indicator initiatives that have been – or are in the process of being – developed; for example, poverty–environment indicators developed for PRSP guidance by the World Bank.

A brief review of environmental issues relevant to the poor identified the following key areas:

- environment and health (including malaria, diarrhoea and respiratory problems, particularly arising from indoor air pollution)
- forest cover
- soil degradation
- water quantity and quality
- fisheries
- natural disasters.

A number of other recurrent themes were identified, including tenure and property rights, and access to drinking water and sanitation. The poor are generally

affected through difficulties in accessing and controlling resources, so improving environmental conditions to reduce poverty may not be a technical matter, but one involving changing institutions and policy instruments, for example. This needs to be reflected in poverty–environment indicators.

The list of generic indicators is shown in Table 1 and has some commonalities with other indicator initiatives reviewed in Chapter 2, illustrating the increasing interest in this area and suggesting there is potential for data collection and sources to be shared in future work.

Pilot Testing the Generic Indicators

The poverty–environment indicators were pilot tested through the use of secondary data sources in Uganda, Nepal and Nicaragua. All the country studies introduced modified wording for many of the indicators, reflecting the specific situations (Table 2). The country studies did not introduce completely new indicators, suggesting that the generic indicators are representative of the environmental issues of relevance to the poor. Some of the indicators were not relevant to the countries, for example fishing in Nepal. As the indicators have been reworded, comparing the values of indicators between countries does become difficult. There are also differences in the availability and collection of data.

Values were found for most indicators, so there are some data already available to explore linkages between poverty and the environment. However, some of the values given do not directly correlate to the indicator, for example, some of the figures are not specific to the poor, or to women. But the values stated do provide a picture of the kind of data available. As expected, there appear to be data available for the environmental health indicators, access to safe water and sanitation, although the figures are not always specific to the poor. Only the Nepal study was able to find data on indicators relating to access to land, the co-management of forests, and indicators associated with housing and with environmentally related natural disasters. Data on reliance on ecologically fragile land were not readily available in any of the studies.

For the indicators to be meaningful they need to relate to – and track progress towards – specific targets and policies relating to poverty reduction. Although the Development Assistance Committee (DAC) targets are useful as a starting point for the indicators, they need to be broken down to more specific targets. There is now more scope to do this and to develop appropriate poverty–environment indicators through the PRSP initiative, which could draw on the list of generic indicators provided in the report. The indicators could then be used to assess how certain policies and initiatives are contributing to poverty reduction.

One of the weaknesses of using generic indicators is that the relationships between poverty and environment are so varied and complex. The indicators simplify the relationships and make generalisations. The complexity and diversity of livelihood strategies cannot be comprehensively captured by any set of indicators. The indicators do, however, have the advantage of at least recognising the complexities of the relationships by breaking them down, informed by knowledge of the experiences of the poor themselves. The development of any set of indicators will be a compromise between the relationships of concern and the ability to collect appropriate data.

The development and use of poverty–environment indicators is likely to continue with further developments in PRSPs. This study provides one approach and set of indicators, with country-specific examples. Further work is needed, particularly on exploring existing and potential data sources and consequent resource requirements.

Where indicators refer to poor groups, these should be defined, using information from national PPAs or other documents. Definitions could include: $1 a day; national poverty line; groups identified as vulnerable in PPAs and other documents; rural/urban distinctions; poor regions/districts.

Seasonal fluctuations, particularly in food and water availability, increase vulnerability – especially for rural communities. In the rainy season, fetching water may take more time, grain prices rise, access to casual labour drops, and flooded streets limit informal commerce. Seasonal variations in indicators are therefore sought where appropriate.

Table 1 Generic Poverty–Environment Indicators

Issues arising from PPAs	Manifestation	Relation to environmental factors	Poverty–environment indicator(s)
Food security and ownership of or access to land	Concern over ability to feed family, including seasonal fluctuations affecting prices and incomes	Access to good land and productivity of land	Proportion of the poor with secure use rights to land for farming Percentage of poor farmers with access to x hectares to grow food for household consumption
Power and voice	Including access to good land and women's access to sanitation facilities (women feel harassed and vulnerable), with implications for disease incidence	Ability to decide how to use and manage natural resources Availability of adequate excreta disposal facilities has implications for environmental health	Area of forests co-managed by user groups with representatives of the poor Access to sanitation facilities by women
Water security	Water is most important for bathing and drinking Less time available for women to draw on other livelihood assets and for children to attend school	Water management regimes conserve resources	Hours spent per day collecting water by women and children living in rural areas (noting seasonal variations)
Agricultural productivity	Particularly access to water for irrigation so that dry-season farming can improve food security	Water management regimes to conserve water and prevent salinisation of irrigated areas.	Percentage of poor farmers with access to sustainable irrigation facilities
Substandard housing	Lack of maintenance and types of materials used by necessity contribute to vulnerability	Environmental health issues. Vulnerability to disasters and flooding	Percentage of people living in substandard housing (rural and urban figures)

Table 2 Generic and Country Indicators

Poverty–environment indicator(s)	Uganda	Nepal	Nicaragua
Illness	Devastating and lasting drain on household resources	Environmental conditions of housing and neighbourhood, including cleanliness and access to water	Proportion of the health burden of the poor related to environmental factors – disease incidence related to environmental factors disaggregated by age (vulnerability of children under 5, for example)
Living in environmentally fragile areas, such as arid and tropical lands with limited soil fertility	Poor people can no longer afford to leave land fallow, which further reduces fertility and yields With no access to other lands, increasing numbers of poor people have also moved to steep hillsides and low-lying coastal areas	Resource degradation including erosion, reduced soil fertility, depleted marine and forestry resources, and declining availability of fresh water	Proportion of the poor living in ecologically fragile areas Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture (either subsistence agriculture or farm labouring?)
Access to non-farm sources of livelihood for the poor living in ecologically fragile areas Access to common property resources by women, especially water, fuelwood and NTFPs	Many traditional coping strategies, such as gathering wood, hunting 'bushmeat', fishing and harvesting herbs, fruits or nuts, rely on common resources Pressure on such resources is intensifying and several studies document that these resources are disappearing Women are much more dependent on gathering forest resources, and the disappearance of non-timber forest products disproportionately affects their well-being	Deforestation and declining fish stocks	Hours spent per day/week collecting fuelwood by women and children in rural areas Percentage of common property land available to women for collecting fuelwood and non-timber products Percentage of poor fisherfolk with access to adequate fish catches
Natural disasters	Vulnerability exacerbated by natural disasters, overwhelming traditional coping mechanisms	Vulnerability exacerbated by living in vulnerable areas Changing climatic conditions exacerbate vulnerability of countries	Percentage of the population living in areas prone to flooding Number of poor people killed by environmentally related disasters Number of poor people made homeless by environmentally related disasters

Table 2 Generic and Country Indicators

Poverty–environment indicator(s)	Uganda	Nepal	Nicaragua
Proportion of the poor with secure use rights to land for farming Percentage of poor farmers with access to x hectares to grow food for household consumption		Percentage of poor with own land Percentage of landless poor Average cultivated area of poor Average area with tenancy right of the poor	
Area of forests co-managed by user groups with representatives of the poor Access to sanitation facilities by women		Percentage of forests managed by user groups with the representative of the poor Access to sanitation	Percentage of the poor working in areas of forest co-managed Percentage of poor people with access to sanitation facilities
Hours spent per day collecting water by women and children living in rural areas (noting seasonal variations)	Percentage of the poor with access to safe drinking water Percentage of the poor with adequate water for livestock Amount of time spent by the poor collecting water Distance travelled by the poor to collect water	Percentage of the poor with access to safe drinking water Amount of time spent by the poor collecting water Distance travelled by the poor to collect water	Percentage of the poor with access to safe drinking water Percentage of the poor with adequate water for livestock Amount of time spent by the poor collecting water Distance travelled by the poor to collect water
Percentage of poor farmers with access to sustainable irrigation facilities		Percentage of irrigated area in total cultivated area of the poor	
Percentage of people living in substandard housing (rural and urban figures)	Percentage of poor people living in temporary shacks without adequate ventilation Percentage of poor people sharing the same place of abode with livestock	Percentage of poor with substandard housing Average house space per household	Percentage of poor people living in substandard housing (rural and urban areas)
Proportion of the health burden of the poor related to environmental factors – disease incidence related to environmental factors disaggregated by age (vulnerability of children under 5, for example)	Incidence of malaria among the poor Incidence of cholera among the poor	Immunisation coverage Infant mortality rate Child mortality rate Maternal mortality rate Use of health facilities	Incidence of malaria among the poor Incidence of cholera among the poor

Table 2 Generic and Country Indicators

Poverty–environment indicator(s)	Uganda	Nepal	Nicaragua
	Incidence of typhoid fever among the poor	Time taken to travel to nearest health facility for the poor	Access to health facilities or trained birth attendant during childbirth
Proportion of the poor living in ecologically fragile areas Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture (either subsistence agriculture or farm labouring?) Access to non-farm sources of livelihood for the poor living in ecologically fragile areas	Percentage of the poor living on marginal land such as fragile highland areas Percentage of the poor living on marginal land such as wetlands Percentage of the poor living on agriculturally unproductive land Percentage of the poor living on highly degraded land (through soil erosion)	Percentage of the poor living on marginal land such as ecologically fragile highland areas, riverside areas Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture	Percentage of the poor living on marginal land such as fragile highland areas Percentage of the poor living on marginal land such as wetlands Percentage of the poor living on agriculturally unproductive land Access to non-farm sources of livelihood for the poor living in ecologically fragile areas
Hours spent per day/week collecting fuelwood by women and children in rural areas Percentage of common property land available to women for collecting fuelwood and non-timber products Percentage of poor fisherfolk with access to adequate fish catches	Percentage of the poor using firewood and charcoal as major source of energy Time spent collecting firewood by the poor per week Percentage of poor women with access to common property land for collecting fuelwood and other non-timber products (Access is defined as freedom to obtain fuelwood from the common property at no cost and without restriction) Amount of fish catch per day per fisherman in poor fishing communities	Percentage of the poor using firewood, straw, thatch, cow dung, leaves. etc. Time spent collecting firewood by the poor Percentage of poor women with access to common property land for collecting fuelwood and other non-timber products	Percentage of the poor using firewood and charcoal as major source of energy Time spent collecting firewood by the poor Percentage of poor women with access to common property land for collecting fuelwood and other non-timber products Amount of fish catch per day per fisherman
Percentage of the population living in areas prone to flooding Number of poor people killed by environmentally related disasters Number of poor people made homeless by environmentally related disasters	Percentage of poor people living in flood-prone areas Number of the poor displaced by landslides Number of the poor displaced by earthquakes	Percentage of poor people living in flood-prone areas Number of deaths due to environmental disasters Number of the poor displaced by landslides Number of poor displaced by fire	Percentage of poor people living in flood-prone areas Number of the poor displaced by landslides Number of the poor displaced by earthquakes Percentage of people made homeless by environmentally related disasters

1.1 Introduction

Many initiatives have developed both indicators to track trends and developments in the state of the environment, and indicators reflecting human development, comparing trends between countries as well as over time. Since the 1992 Earth Summit, many communities, countries and international organisations have developed sustainability indicators that attempt to measure progress towards sustainable development. These are generally categorised as economic, environmental and social indicators and, while they represent a step towards better integration of data and issues relating to poverty and the environment, the issues are generally presented sectorally and few links are made.

There is a lack of indicators reflecting the relationships between human development (particularly poverty) and environmental issues. This is highlighted in the recent initiative of the World Bank/International Monetary Fund (IMF) to promote the development of Poverty Reduction Strategy Papers (PRSPs), which set out the poverty profile of a country and key initiatives that will contribute towards poverty reduction. The process of developing such a strategy builds on the use of participatory poverty assessments (PPAs) which, through broad consultation with the poor and representatives of the poor, aim to identify key issues of concern and relevance to the poor. Guidance on the production and use of PRSPs requires that poverty elimination is monitored through a series of key indicators. Many country PRSPs produced to date have not sufficiently considered environmental issues or recognised the linkages between poverty and the environment (SDU, 2000), and associated poverty–environment indicators have not been generated.

This report sets out the key findings of a study conducted between September 2000 and April 2001 to develop and pilot test a set of generic poverty–environment indicators for potential use in PRSPs. The indicators were developed through a review of environmental issues of relevance to the poor, particularly drawing on findings from PPAs. The process, issues and draft indicators are set out in Chapter 2. The draft indicators were then pilot tested in three countries: Uganda, Nepal and Nicaragua. These countries were selected as they have produced, or are in the process of producing, a PRSP; and because they represent different geographical regions and conditions.

The results of pilot testing are discussed in Chapter 3, and potential ways forward are reviewed. This introductory chapter briefly reviews the role and nature of indicators, and reviews some of the literature exploring the linkages between poverty and environment.

1.2 Poverty Reduction Strategy Papers

The World Bank and IMF have established a requirement that Highly Indebted Poor Countries should develop PRSPs, and this is now being extended to all International Development Assistance recipient countries. The development of PRSPs involves:

- understanding the nature and locus of poverty
- choosing public actions that have the highest poverty impact
- selecting and tracking outcome indicators.

(World Bank, 2000c)

The content, priorities and types of indicators will vary between countries, depending on the nature of poverty

and the actions that will have most impact on reducing poverty. The role of environmental resources and management in poverty reduction will also vary.

A qualitative review of how environmental issues have been addressed in PRSP documents (SDU, 2000), conducted by the Department for International Development (DFID), has drawn a number of conclusions relevant to this study, including the following.

- The environment-related priorities most commonly identified are sanitation and natural resource management (including forestry, and land and water resource management).
- Fisheries, and coastal issues more generally, are ignored in most countries, despite fisheries being a clear example of a natural resource that the poor depend on both for their livelihoods and, more broadly, for protein.
- Disaster preparedness is highlighted in a very few countries, but there is less mention of addressing root causes.
- Sectoral linkages with the environment are generally limited and focus mainly on agriculture.
- Links between health and the environment appear either through sanitation or, in a few countries, through indoor air pollution, but there is only one example of links with water management and vector-borne disease.
- Very few countries have included indicators to monitor poverty–environment links (SDU, 2000, p. 3).

The World Bank *Sourcebook for PRSPs* contains a chapter on the environment (Bucknall et al., 2000) providing guidance on how environmental issues can be better integrated into PRSPs. This chapter suggests that linkages between environment and poverty have to be analysed; actions chosen; and results monitored. This would include the use of poverty–environment indicators, as discussed in section 2.4.1.

Poverty Reduction Strategy Papers recognise the diversity of poverty within and between countries, and aim to ensure that actions taken to address poverty are well informed and designed. This requires a good understanding of who the poor are.

1.3 What is 'Poverty'?

The past decade has seen the re-emergence of 'poverty' onto the international development agenda, marked by the *World Development Report 1990* (World Bank, 1990). But there has been – and continues to be – much debate about how poverty should be defined.

Poverty has been defined according to what is prioritised as a 'need'. It is usually conceptualised as an economic or social condition, and has major implications for policy. Income/consumption measures are conventionally used to map poverty. A person is poor when their personal income or consumption is below a specified 'poverty line' (Coudouel and Hentschel, 2000). However, personal income can vary greatly from year to year, is only appropriate for wage-earners, and has less relevance to the poor. Many poor people rely on their own production and informal-sector activities in which the concept of profit is unclear, rather than on a formal income (Glewwe and Van der Gaag, 1988).

In the 1960s consumption of goods and services gained favour as a superior poverty indicator, as it presents a more stable indicator over time than income. A bundle of goods deemed necessary for meeting basic needs is identified, consisting of food expenditure and modest expenditure on non-foods (Lipton and Ravallion, 1993). Despite subsequent broadening of the definition of poverty, consumption has remained the most widely used indicator (Baulch, 1996).

As the definition of poverty expanded with the concept of basic needs in the 1970s, so qualitative indicators expanded to incorporate the satisfaction of those needs. These indicators incorporated aspects of ill-being, such as poor nutrition, shelter, clothing and access to health services. In the late 1970s Amartya Sen introduced the concept of 'capabilities' to replace the basic needs concept (Westendorff and Ghai, 1993).

The entitlement approach draws on Sen's work, and leads to a definition of poverty that is concerned not only with material well-being, but also with opportunities – what people can or cannot do (capabilities) as well as what they are or are not doing (functions) (NRSP, 2000). From this understanding of poverty, the United Nations Development Programme (UNDP) developed its Human Development Index as an alternative to income/consumption measures of poverty. Three dimensions of human deprivation are captured in this index, which draws from measures of life expectancy, adult literacy and access to health services and safe water, as well as percentage of underweight under-fives.

'[Poverty] is deprivation in the most essential capabilities of life, including leading a long and healthy life, being knowledgeable, having adequate economic provisioning and participating fully in the life of the community' (UNDP, 1997).

The *World Development Report 2000/01* (World Bank, 2000b) claims 'to broaden the notion of poverty to include vulnerability and risk – and voicelessness and powerlessness' (p. 15). Although Chambers (1989) stresses that vulnerability is not the same as poverty, it is an important aspect, as poor people are more vulnerable to shocks and stresses due to the lack of assets available to help them cope. Vulnerable people are those who 'are more exposed to risks, shocks and stresses; and with the loss of physical assets and fewer and weaker social supports, they have fewer means to cope without damaging loss' (Chambers, 1997, p. 7).

Participatory approaches to poverty also challenge the conventional definitions, expounding the direct inclusion of the poor themselves in the process of defining poverty. It is argued that income/consumption poverty has assumed importance only because of its importance as a developed world state. According to Chambers (1995), when the poor are asked, income deprivation is quite low on their priority ranking, below self-respect and lack of domination. The participatory school asserts that the conventional understanding of poverty does not allow for its fundamental subjectivity.

For the poor, poverty is a local, diverse and dynamic condition. While poverty relates to a lack of physical necessities, assets and income, it is also more than this. In preparing its *World Development Report 2000/01,* the World Bank drew heavily on PPAs. These studies draw out both the psychological experience and impact of poverty, identifying closed economic opportunity, vulnerability and insecurity as key components of living in poverty: 'to be poor was to experience illbeing in many ways, and to suffer multiple disadvantages that reinforce each other and interlock to trap them' (World Bank, 2000b, p. 40).

Poverty is now seen as multidimensional, 'dynamic, complex, institutionally-embedded, and a gender- and location-specific phenomenon' (World Bank, 2000a, p. 4). The poor are not a homogeneous group, but experience poverty in different ways, requiring a range of policy responses and measurements. In terms of the linkages between poverty and environment, these are inevitably complex and diverse, reflecting the diversity of poverty dimensions and experiences.

1.4 What is the 'Environment'?

The environment is widely recognised as a broad term with many interpretations and definitions. The term 'environment' may be used narrowly, with reference to 'green' issues concerned with nature such as pollution control, biodiversity and climate change; or more broadly, including issues such as drinking water and sanitation provision (often known as the 'brown agenda'). Neefjes (2000, p. 2) uses the term in a broad sense, referring to the environment as 'a vehicle for analysing and describing relationships between people and their surroundings, now and in the future.'

Bucknall (2000, p. 3) notes that the environment generally refers to a natural resource base that provides sources and performs sink functions, and uses a broad definition of the environment in his background paper to the World Bank's Environment Strategy.

The broad interpretations of both poverty and environment mean that understanding the linkages between the two is particularly challenging.

1.5 Understanding the Linkages between Poverty and Environment

Due to the increasing focus on the urgency of reducing poverty, and the broadening understanding of poverty, many international organisations are attempting to develop a better understanding of the linkages between poverty and the environment. There has been a move away from the simplistic approach of viewing poverty and environmental degradation as being 'linked in a downward and mutually enforcing cycle' (Forsyth and Leach, 1998, p. 4), also referred to as the 'poverty trap thesis' (Prakash, 1997). Figure 1.1 illustrates this cyclical relationship.

Figure 1.1 The cyclical relationship between environment and poverty

Broad (1994) sets out the key features of the traditional argument as:

- poverty is viewed as one of the primary causes of environmental destruction
- poor people cannot in their present state practise sustainable development (short-term maximisers)
- if much of the environmental problem is poverty, then eliminating poverty and poor people through (economic) growth becomes key to saving the environment.

Broad rejects this circular argument and attempts to break down the conventional notions of the poverty–environment linkages through:

- asking why are the poor poor?
- recognising that some poor people act not as environmental degraders, but as environmental sustainers
- acknowledging that there are cases where the poor have become environmental activists.

The idea of a circular relationship between environment and poverty is now widely seen as too simplistic, ignoring the complex circumstances in which the poor find themselves (Ambler, 1999; Scherr, 2000). Prakash (1997, p. 3) suggests that the causal roots of environmental degradation 'lie in institutional and policy issues rather than in poverty itself'. He goes on to conclude that 'the relationship between poverty and environment is mediated by institutional, socio-economic and cultural factors' (Prakash, 1997, p. 23). The complexity of the relationships often contributes to inadequate understanding and policy responses. As noted by Markandya and Galarraga (1999), 'it is important to recognise the paucity of information on the linkages between poverty and environmental policies.'

The concept of environmental entitlements is one approach to understanding the relationships between environment and poverty. The key issue raised by this approach is that the links between environmental change and impoverishment are not direct, but are mediated by poor people's interactions with particular environments, structured by macro-level processes (Leach and Mearns, 1991). Environmental entitlements refer to two main attributes: access to resources; and control over the use of those resources.

Environmental entitlements may be defined by:

- government legislation
- markets
- common property resource-management arrangements
- land tenure
- customary rights
- resources to 'make effective use of' – for example capital and technology
- gender roles.

The approach highlights the role of institutions in mediating relationships between people and environments (Leach *et al*., 1997). Other approaches adopt similar views – that the relationships between poverty and environment are complex, and that there are many different types of relationship (positive and negative). There is wide recognition that poor people in developing countries, particularly in rural areas, rely on natural resources for their livelihoods. Improving access to and control over environmental resources by the poor should provide a mechanism for the reduction of poverty.

Indicators may provide one way of breaking down the linkages and developing a better understanding, leading to more appropriate and effective policy and project interventions. However, the complexity of the relationships also presents an obstacle to the development and use of such indicators.

1.5.1 Gender, poverty and environment

While considering the linkages between poverty and environment, the literature highlights the role of gender in determining access to and control over environmental resources. Joekes *et al*. (1996) suggest

that 'social rules determining individuals' access to environmental resources are biased in terms of gender.' Women are noted as having different roles from men in terms of environmental resources – they are often responsible for gathering fuelwood and collecting water, for example, although they may not be involved in managing those resources. But Joekes *et al*. (1996, pp. 3–4) caution against viewing women as a homogeneous group: 'women are usually differently positioned in relation to environmental resources according to their age as well as to class, ethnicity and so on.'

Leach *et al*. (1995, pp. 6–7) identify several key issues relating to the relationship between gender and the environment. These include:

- gendered division of labour and responsibility, which influences women's relationship to environmental change
- gendered property rights, as a mediator in gender–environment relationships
- gendered positioning in households, communities and other institutions
- influence of the wider political economy on gender relationships and gender–environment relations
- ecological characteristics that determine the processes of gender and environmental change.

Indicators developed to reflect the relationships between poverty and environment should incorporate the appropriate gender dimensions.

1.6 Role and Nature of Indicators

Indicators are used in many situations to track changes over time, indicate progress, and compare locations. Information derived from indicators can be used to inform policy decisions and to highlight both problems and progress. Mikkelsen (1995, p. 85) suggests that indicators are used for two main purposes in development:

- to differentiate central concepts, such as quality of life, livelihood and poverty, in order to classify or rank societies and social groups along the indicators
- to measure progress relating to interventions for social and economic change at the project or programme level.

In background papers for a DFID-funded research project, 'The Effects of Policy on Natural Resource Management and Investment by Farmers and Rural households in East and Southern Africa', Rigby *et al*. (2000) suggest that indicators acquire meaning only when set in the context of a pre-specified value, whether a threshold, target or benchmark. Prennushi *et al*. (2001, p. 4) use the following definitions of goals, targets and indicators:

- *goals* are the objectives a country or society wants to achieve; they are often expressed in non-technical, qualitative terms, such as 'reduce poverty'
- *indicators* are the variables used to measure progress toward the goals
- *targets* are the quantified levels of indicators that a country or society wants to achieve at a given point in time.

Expanding on this definition of indicators, Rigby *et al*. (2000) draw on Gallopín (1997), who identifies major functions of indicators as to:

- assess conditions and changes
- compare across places and situations
- assess conditions and trends in relation to goals and targets
- provide early warning information
- anticipate future conditions and trends.

Many indicator initiatives differentiate between different types of indicators. Woodhouse et al. (2000, p. 31) suggest that the following may be used in developing sustainability indicators for natural resource management:

- generic – internationally agreed
- local – local or site-specific
- measurement – often quantitative, precise and replicable
- proxy/surrogate – more indirectly related to the issues in question.

Within any set of indicators there may be different types, requiring different types of data, and having different properties. Prennushi *et al*. (2001, p. 5) provide two main categories of indicator:

- *intermediate* – measures a factor that determines an outcome or contributes to the process of achieving an outcome; intermediate indicators may be further subdivided into 'input' and 'output' indicators
- *final* – measures the effect of an intervention on individuals' well-being; final indicators may be further subdivided into 'impact', measuring key dimensions of well-being, and 'outcome', referring to access to, use of, and satisfaction with public services.

Finally, in addition to the different types of indicators, a range of desirable properties have been identified suggesting that indicators should be SMART (specific, measurable, attainable, relevant, timebound). Table 1.1 sets out the desired characteristics of SMART indicators.

Rigby *et al*. (2000) explore issues surrounding the development of indicators, including issues of scale (level of indicators and aggregation of data); who identifies the indicators (whether internal/community or external/expert); and whether indicators are to be used to compare across time or locations, or both. Decisions about such issues will be informed by the purpose of the indicators and the data available, just as logistics and resources must be taken into account when considering data collection. Secondary data sources – data that have been collected for other purposes – should be used with care as the assumptions and definitions may be different.

Prennushi *et al*. (2001, p. 8) also discuss the role of disaggregating indicators into geographical areas; administrative units; gender; income; consumption; and socially defined groups. This may make data collection more complicated, but is particularly critical in efforts to explore poverty–environment relationships where there are differences that may be regional, or gender- or age-specific, for example.

This brief review of the role of indicators highlights a number of points:

- indicators must be developed in relation to goals and targets

Table 1.1 SMART Properties of Indicators

Properties	Definition
Specific	Indicators should reflect those things the project intends to change, avoiding measures that are largely subject to external influences
Measurable and unambiguous	Indicators must be precisely defined so that their measurement and interpretation is unambiguous Indicators should give objective data, independent of who is collecting the data Indicators should be comparable across groups and projects, thus allowing changes to be compared and aggregated
Attainable and sensitive	Indicators should be achievable by the project and therefore sensitive to changes the project wishes to make
Relevant and easy to collect	It must be feasible to collect data on the chosen indicators within a reasonable time and at a reasonable cost
Time-bound	Indicators should be relevant to the project in question Indicators should describe by when a certain change is expected

Source: Roche (1999, p. 48).

- different types of indicators aim to achieve different objectives; this publication is concerned with the development of generic indicators
- as the indicators being developed are generic, they could have either intermediate or final elements when refined for country-specific situations and related to specific goals and targets
- the development of country-specific poverty–environment indicators can usefully draw on participatory exercises to increase their relevance, but would ideally involve a range of stakeholders at country level
- the disaggregation of indicators is particularly relevant for poverty–environment indicators, as the relationships between the poor and their environments differ due to a range of factors (from political situations to age and gender).

As this project aimed to develop a set of generic indicators from which country indicators can be drawn and further refined, they are not linked to specific targets; this is discussed further in Chapter 2.

1.7 Why Poverty–Environment Indicators?

Indicators reflecting trends in poverty levels and conditions (well-being), and reflecting the state of the environment, have been developed by a number of organisations. Building on these, there have recently been attempts to look at the potential for poverty–environment indicators that reflect poor people's access to and use of the environment and natural resources. A number of papers on poverty and environment suggest a role for indicators in this area. Ekbom and Bojö (1999, p. 19) suggest that it is critical to 'identify and systematically use appropriate indicators

to enhance our knowledge … ideally, these indicators should encompass *both* poverty and environment and should capture the mechanisms through which they are linked.'

But caution has been advocated: in a background paper commissioned by the World Bank for their Environment Strategy: Henninger and Hammond (2000) suggest that 'the development of indicators that are both pertinent to poverty reduction and to environmental and natural resources management will require a long-term strategy and significant investments in data collection, conceptual development, and analysis.' They suggest this is because of:

- the multi-dimensionality of poverty
- a lack of environmental data
- complex relationships between environmental conditions and poverty outcomes.

The approach of Henninger and Hammond (2000), based on spatial analysis of poverty and environment, reflects these concerns. They recommend the use of ecosystem-specific indicators and poverty mapping.

Other work by the World Bank also discusses the role of poverty–environment indicators, particularly with respect to their use in PRSPs. Bucknall et al. (2000) put forward an approach to the integration of environment into PRSPs that involves:

- analysing linkages between poverty and environment
- selecting specific outcome indicators and targets to address the development problems of highest priority
- evaluating options for reaching those targets.

Several initiatives are looking at the potential role of poverty–environment indicators and the resources that would be needed to develop and monitor them.

1.8 Toward the Development of Poverty–Environment Indicators: Key Issues

This chapter highlights a number of issues to consider in developing poverty–environment indicators. These include issues surrounding how poverty and environment linkages are understood; and the role and nature of indicators generally. Indicators should relate to targets, goals or objectives; they should be set at appropriate scales (local, national, international); and data collection and sources, as well as who selects the indicators, should be considered. Poverty–environment indicators should reflect the priorities of the poor, noting their diverse experiences, and should ideally be determined through consultation with the poor. There are sources of information that can be used to ascertain the priorities of the poor, particularly from exercises such as PPAs.

The diversity of poor people's situations and their relationships with the environment mean that a good understanding is needed of who the poor are, and of their priorities, in each country where indicators may be developed. The different relationships that women, men and children have with their environments, influenced by gender roles, means that for some indicators data should be collected separately for women and men, or that some indicators may refer to women or men only.

2.1 Introduction

The purpose of this study is to identify a generic set of indicators. It is not suggested that these indicators can be used in every situation and at every level. Indeed, this cannot be the case as countries, and regions within countries, may differ greatly in the relationships between poverty and environment. It may be more appropriate to develop indicators at different levels – local, national and international.

This chapter identifies key environmental issues of relevance to the poor through a brief review of key documents and through an analysis of *Voices of the Poor* (World Bank, 2000a) – a publication which reviewed nearly 100 PPAs from around the world. The chapter includes a selection of related indicator initiatives with which information and lessons could be shared, and sets out how the generic set of poverty–environment indicators were developed, relating these to the OECD Development Assistance Committee (DAC) targets.

2.2 Environmental Issues of Relevance to the Poor

Research evidence points to particular areas of environmental concern of relevance to the poor. The DFID Target Strategy Paper *Achieving Sustainability: Poverty Elimination and the Environment* (DFID, 2000a) identifies the following environmental issues as most significant to the livelihoods of the poor:

- role of environmental factors in the health burden of the poor
- soil degradation
- changes in biodiversity
- deforestation – wood products, food and medicine
- degradation of coastal areas
- increasing water demands – overabstraction and pollution
- natural disasters.

The World Bank suggests that the priorities are environmental health and natural resource management. Expanding on these, Bucknall *et al*. (2000, p. 5) suggest that the dimensions of poverty most affected by the environmental agenda are health, economic opportunity, security and empowerment. They outline the following environmental factors as impacting on poverty:

- quality of natural resource base
- access to natural resources
- access to water and toilets
- air quality
- access to environmental information
- ecological fragility.

The main issues associated with health, common property resources and security are further outlined, reflecting the main areas of concern to the poor.

2.2.1 Environment and health

DFID (2000a, p. 16) suggests that 'environmental factors are responsible for almost a quarter of all disease in developing countries.' Women and children are most at risk due to water-borne vectors, inadequate sanitation facilities and indoor air pollution. Table 2.1 sets out the environmental contribution to some diseases. The importance of environmental factors highlights the role of good environmental management in reducing the risk

Table 2.1 Environment and the Burden of Disease

Disease	Global DALYs (000s)	Percentage attributed to environmental causes
Acute respiratory infections	116 696	60
Diarrhoeal diseases	99 633	90
Vaccine-preventable diseases	71 173	10
Tuberculosis	38 426	10
Malaria	31 706	90
Unintentional injuries	152 188	30
Intentional injuries	56 459	–
Mental health	144 950	10
Cardiovascular disease	133 236	10
Cancer	70 513	25
Chronic respiratory condition	60 370	50
Subtotal	**975 350**	**33**
Other diseases	403 888	–
TOTAL ALL DISEASES	**1 379 238**	**23**

Source: Murray and Lopez (1996); DFID (2000a, p. 16).
Note: Disability-adjusted life years (DALYs) are a measure of the burden of disease. They reflect the total amount of healthy life lost to all causes, whether from premature mortality or from some degree of disability over a period.

of disease – of major concern to the poor as serious illness can push a household further into poverty, taking many years to recover.

Bibby *et al*. (1999) suggest that the most important environmental health hazard is faecal contamination of water and food due to poor or non-existent excreta disposal and inadequate hygiene. This is made worse by inadequate and unsafe water supplies.

Bucknall *et al*. (2000), in guidance on how environmental issues should be addressed in developing PRSPs, highlight the role of environment and health in the livelihoods of the poor, stressing the role of poor water and sanitation in child health and survival.

2.2.2 Common property resources

Many of the natural resources identified in section 2.2 are accessed by the poor through common property arrangements. It is widely acknowledged that common property resources play an important role in the livelihood strategies of the poor; it has been estimated that in India, for example, common property resources contribute some US$5 billion to the incomes of poor rural households, or about 12% to household income (Beck and Nesmith, 2001). Common property resources include food, fuel, fodder, fibre, small timber, manure, bamboo, medicinal herbs, oils, materials for house building and handicrafts, resin, gum, honey and spices (Agarwal, 1995, p. 2). With reference to the dry regions of India, Jodha (1986) defines common property resources (CPRs), and the areas where they are gathered, as:

'the resources accessible to the whole community of a village and to which no individual has exclusive property rights. In the dry regions of India, CPR gathering areas include village pastures, community forests, waste lands, common threshing grounds, waste dumping places, watershed drainages, village ponds, tanks, rivers/rivulets, and riverbeds, etc.'.

Beck and Nesmith (2001) suggest that common property resources in India are also gathered from privately owned land, such as the right to collect cow dung or graze cattle on private fields. They suggest that 'access rights may not be clearly defined legally in the case of these spaces, but rather depend on a process of negotiation, bargaining or conflict between poor and elites, and on a system of customary rights whereby the poor access the land of the elites' (p. 121).

From their review of literature on the role of common property resources in the livelihood strategies of the poor, Beck and Nesmith (2001, p. 129) conclude that:

- common property resources are vital resources for the poor, particularly in the lean or preharvest season, or other times of stress
- women, in particular, are involved in accessing and using common property resources, but not usually in management
- common property resources are of greater importance to the poor than to the rich
- poor people are being progressively excluded from these livelihood resources by privatisation and commercialisation
- indigenous institutions for common property resource management are under strain due to modernisation and globalisation pressures, and conflicts between users are apparent; the extent of influence of the poor on such institutions is (where understood) limited.

Issues surrounding access to, and control over, common property resources are critical aspects of the livelihood strategies of the poor, and should be considered in the development of poverty–environment indicators. Gender roles are particularly relevant with regard to the use and management of common property resources (Agarwal, 1997).

2.2.3 Environment and security

Security and vulnerability are raised as issues by the poor time and time again, as it is their lack of capacity to absorb shocks that increases the hold poverty has on their lives. Environmental degradation and natural disasters contribute to their vulnerability. Bucknall et al. (2000, p. 8) suggest that a lack of access to protective technologies or engineering devices, and a lack of social safety nets, increase the vulnerability of the poor in the face of natural disasters.

2.3 Sustainable Livelihoods Approach

The concept of livelihood strategies builds on the now widely accepted broad interpretation of poverty, and provides a way of exploring more deeply the role of environmental resources in the livelihoods of the poor. A widely accepted definition of a livelihood (provided by Chambers and Conway) is given by Carney (1998, p. 4) as:

'a livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.'

Singh and Gilman (1999, p. 540) suggest that 'livelihood systems consist of a complex and diverse set of economic, social, and physical strategies. These are realised through the activities, assets and entitlements by which individuals make a living.' Building on the understanding of livelihood systems and strategies, Singh and Gilman (1999) define sustainable livelihoods

as those 'derived from people's capacities to exercise choice, access opportunities and resources, and use them in ways that do not foreclose options for others to make their living, either now, or in the future.' The definition of sustainable livelihoods has informed analyses that aim to improve sustainability.

2.3.1 Sustainable livelihoods framework

Sustainable livelihood approaches have arisen from 'evolving thinking about poverty reduction, the way the poor live their lives, and the importance of structural and institutional issues' (Ashley and Carney, 1999, p. 4). A sustainable livelihood framework has been developed by DFID in order to improve development activity through:

- systematic – but manageable – analysis of poverty and its causes
- taking a wider and better informed view of the opportunities for development activity, their impact and 'fit' with livelihood priorities
- placing people and the priorities they define firmly at the centre of analysis and objective-setting

(Ashley and Carney, 1999, p. 6).

The approach has been defined by Ashley and Carney (1999) as a way of thinking about the objectives, scope and priorities for development, in order to enhance progress in poverty elimination. The framework facilitates analysis of the relationships between poverty and environment by highlighting aspects relevant to decisions about livelihood strategies. The use of the framework in developing poverty–environment indicators emphasises the role of structures and processes, for example in mediating access to and control over environmental resources.

Using the sustainable livelihoods framework enables a more holistic approach to development activity, recognising that people have a range of strategies on which they base their livelihoods. The framework is shown in Figure 2.1, and can be used as a checklist to identify issues that should be explored. A core feature of the framework is an analysis of the five different types of asset upon which individuals draw to build their livelihoods. These are natural, social, human, physical and financial capitals, as described in Box 2.1.

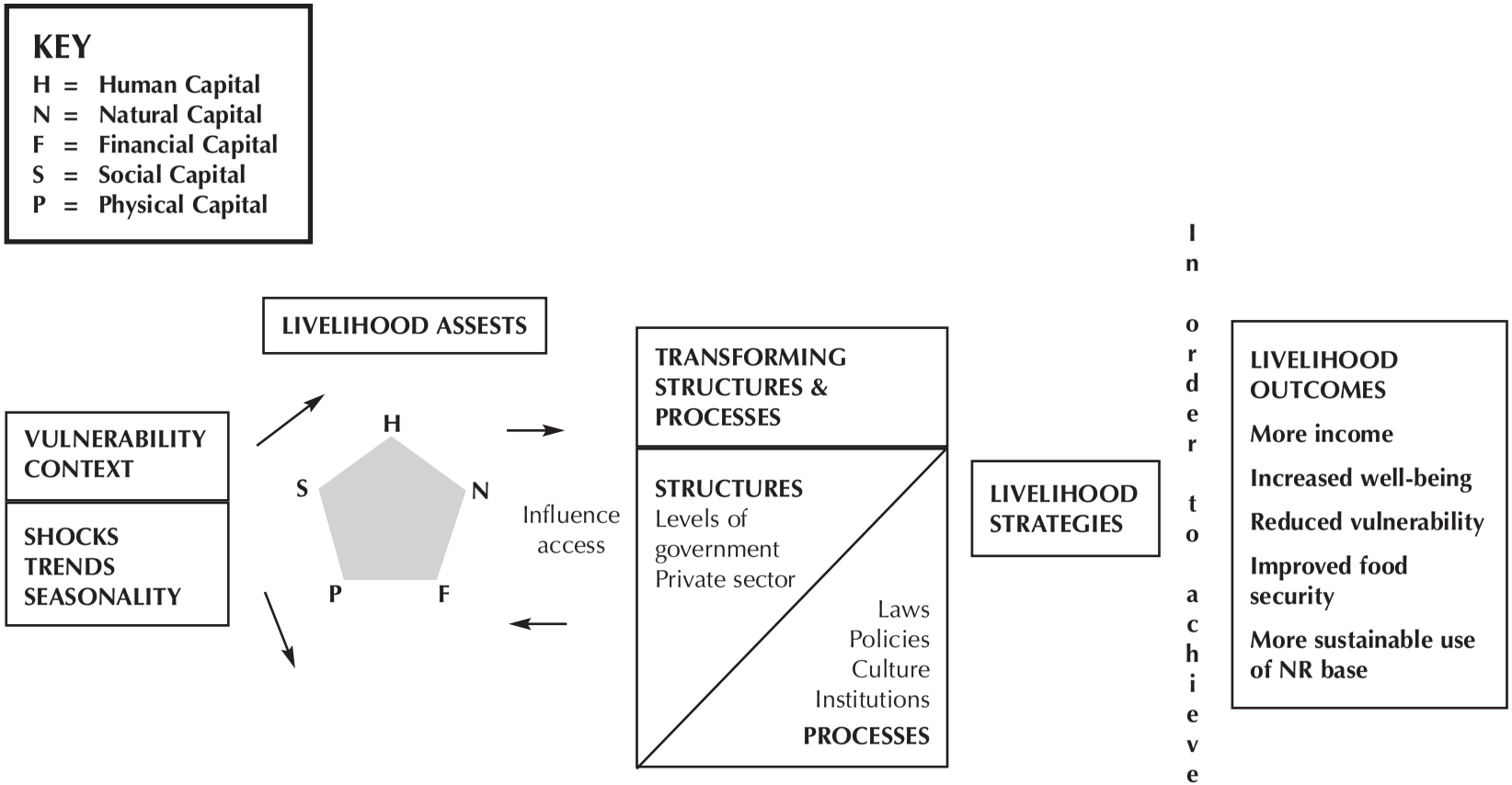
The approach suggests that associated monitoring and evaluation should be people-centred, and that indicators are identified by and negotiated with partners/beneficiaries who should also play a role in data collection and analysis. This approach recognises that livelihood strategies are dynamic, and the DFID guidance sheets recommend that a mixture of indicator types are required:

- *outcome indicators* relating to longer-term targets; measurement indicates what has been achieved
- *process indicators* measuring ongoing processes towards planned outcomes
- *leading indicators* suggesting what will happen, especially over the longer term

(DFID, 2000b).

While calling for the use of multiple and complementary indicators, DFID recognises that there may be problems. Where indicators are beneficiary-defined, they are often context-specific and may be difficult to aggregate up to national indicators, for example.

Figure 2.1: Sustainable Livlihoods Framework



Source: Ashley and Carney, 1999: 47

Box 2.1 Capital assets

Natural capital: The natural resource stock from which resource flows useful for livelihoods are derived (e.g. land, water, wildlife, biodiversity, environmental resources).

Social capital: The social resources (networks, membership of groups, relationships of trust, access to wider institutions of society) upon which people draw in pursuit of livelihoods.

Human capital: The skills, knowledge, ability to labour and good health important to the ability to pursue different livelihood strategies.

Physical capital: The basic infrastructure (transport, shelter, water, energy and communications) and the production equipment and means which enable people to pursue their livelihoods.

Financial capital: The financial resources which are available to people (whether savings, supplies of credit or regular remittances or pensions) and which provide them with different livelihood options.

Source: Carney (1998, p. 7).

2.4 Other Indicator Initiatives

There are a wide range of related indicator initiatives throughout the world, at local, national and international levels. Other indicator initiatives may provide sources of information and methodologies. These include human development indicators; World Development Indicators; and a wide range of sustainability and environmental performance indicators. Many of these initiatives are sector-specific, and address poverty and environment issues separately. But there may be scope for shared learning and information, and a few selected initiatives are reviewed here for information.

2.4.1 Poverty–environment indicators developed for PRSP guidance

The World Bank's Sourcebook for PRSPs contains a chapter on environmental issues (Bucknall et al., 2000). From a review of environmental issues relevant to the poor, a number of potential indicators are identified. These are set out in Table 2.2.

Table 2.2 Poverty Outcomes and Environmental Interventions

HEALTH OUTCOMES

Source of health damage	Associated public action	Health outcome affected	Monitorable health indicators	Proxy sector indicators
Indoor air pollution	Energy (cleaner fuels, improved stoves) Rural development	Mortality Chronic lung disease Acute respiratory infections	Deaths (child) Symptom days/chronic lung disease Cases of acute respiratory infection	Number/share of households using clean fuels/improved stoves Type of housing
Outdoor air pollution	Energy/heating Transport	Mortality Chronic lung disease Acute respiratory infections Respiratory hospital admissions IQ impairment (lead)	Deaths (adult) Symptom days/chronic lung disease Cases of acute respiratory infection Respiratory hospital admissions	Annual mean levels of PM10 ($\mu g/m^3$) Lead level in blood (children) (mg/dl?)
Vector-borne disease	Irrigation Reforestation Infrastructure (drainage) Health (vector control)	Malaria mortality Malaria morbidity	Deaths due to malaria Malaria cases	
Lack of water and sanitation	Infrastructure Social funds	Diarrhoea mortality Diarrhoea morbidity	Deaths due to diarrhoea (child) Diarrhoea cases (child)	Access to sanitation (% of households, urban/rural) Community coverage (% of HHs in a community) Access to water (% of households, % of households with in-house connections, local, urban/rural)
Pesticide residues	Agriculture	Acute poisoning Cancers Fetal defects	Cases of acute poisoning Cases of cancers Spontaneous abortions	Application norms Storage and handling practices
Other toxic substances	Industrial pollution control	Cancers IQ impairment (lead)	Cases of cancers	Environmental performance Waste-management codes Land zoning regulations

Table 2.2 Poverty Outcomes and Environmental Interventions

LIVELIHOOD OUTCOMES*

Source of loss of livelihood	Associated public action	Livelihood outcome affected	Monitorable livelihood indicators	Proxy sector indicators
Policy distortions/ ineffective institutions/ imperfect property rights	Policy reforms (pricing, subsidies, etc.)	Sustainable livelihoods	Productivity, nutrition	Natural and social capital (e.g. resource productivity, water scarcity, security of tenure)

VULNERABILITY OUTCOMES

Source of vulnerability	Associated public action	Security outcome affected	Monitorable security indicators	Proxy sector indicators
Natural disasters† –immediate threat to life	Improve prediction and emergency preparedness	Death (human and animal)	Number of deaths in equivalent disasters	Existence of/capacity to use prediction equipment
Natural disasters–temporary loss of livelihood	Improve access to insurance	Loss of income	Stunting before and after disasters	Malnutrition
Natural disasters–loss of savings	Improve access to insurance, micro-credit	Lack of education	Enrolment before and after disasters	Ability to restore savings
Natural disasters–permanent loss of livelihood	Improve disaster relief	Displacement	Number of environmental refugees in equivalent disasters	Capacity to channel relief aid and rebuild affected areas quickly

*One of many possible examples for links between economic opportunities and environment interventions. There is no generic relationship between outcomes related to economic opportunities and environmental interventions. Causal effects do not follow any patterns that can be generalised, nor are they unidirectional. They will always depend on specific national or regional circumstances.
†Includes droughts, floods, hurricanes, earthquakes, landslides and cyclones.

Source: Bucknall et al. (2000).

2.4.2 Indicators on the web

The World Bank has developed a number of initiatives to promote the use of environmental indicators in projects and Country Assistance Strategies. The 'Indicators-on-the-web' initiative is designed to provide examples of appropriate environmental indicators for World Bank projects. Examples include those shown in Table 2.3.

The development of indicators for the Country Assistance Strategies also contain environmental indicators including:

- under-five mortality rate (per 1000 births)
- access to sanitation in urban areas (%)
- depletion estimates
- degradation estimates.

These environmental performance indicators are inadequately linked to poverty reduction, but could be modified to reflect how issues such as deforestation affect the poor. Such indicators would require baseline data on who the poor are in terms of project beneficiaries, and on the nature of the relationships between poverty and environment.

2.4.3 Sustainability indicators for natural resource management and policy

The research project 'Effects of Policy on Natural Resource Management and Investment by Farmers and Rural Households in East and Southern Africa' is concerned with identifying links between the sustainability of different farming systems and agricultural policy, including the identification of criteria to assess the 'success' of different systems. The project has identified a set of generic indicators for testing, making use of the sustainable livelihoods framework. Woodhouse et al. (2000) identify issues relevant to assessing the sustainability of particular strategies for natural resource use; these are shown in Table 2.4.

Table 2.3 Examples of Environmental Indicators at National/Regional Level from the Indicators-on-the-web Initiative

Sector	Indicators: outcome	Indicators: impact
Water-management–agriculture	Number of spate irrigation and water recharge works	Improved small-scale irrigation area
Water-management–other	Increase in number of households receiving good quality water and with guaranteed supply	Increased water availability (%)
Land management	Rural income increase (%)	Proportion of communities with access to roads (%)
Forests	Rate of deforestation (ha/year)	Area of forest

Table 2.4 Potential Outcomes Relating to Capital Assets

Asset capital	Outcomes
Natural	Access to land, water, grazing Ownership of herds, trees Productivity (per unit of land, per unit of water, per unit of inputs) Soil, water, rangeland, quality Biodiversity
Financial	Income levels, variability over time, distribution within society Financial savings, access to credit Debt levels
Physical	Access to roads, electricity, piped water Ownership/access to productive equipment (oxen, tractor, irrigation pump, etc.) Housing quality
Human	Total labour Educational level, skills Health levels
Social	Membership of organisations Support from kin, friends Accountability of elected representatives

Source: Woodhouse et al. (2000, p. 9).

Table 2.5 Examples of Data Requirements and Sources for Sustainability Indicators for Natural Resource Management and Policy

Level	Data requirements
District	Agricultural production trends Incidence of flood damage in recent years Incidence of fire damage in recent years Percentage of agricultural land provided with irrigation Percentage of agricultural land provided with flood protection
Village or 'community'	Local or customary control over land Conflicts over land, water Production foregone or increased costs as a result of security problems (insecurity of land tenure, crop or livestock theft) Incidence of fire, flood damage in the past 5 years
Household or farm	Production foregone or increased costs as a result of security problems (insecurity of land tenure, crop or livestock theft) Incidence of fire, flood damage in the past 5 years Percentage land with irrigation Percentage land protected from flood
Plot	Number of years of cultivation (fallow, rotation history) Yield of crop or livestock per hectare

See Woodhouse *et al*. (2000, pp. 27–28) for complete list.

Woodhouse *et al*. (2000, pp. 27–28) identify sustainability indicators at various levels (national, district, village or 'community', household or farm, and plot) that should draw on secondary sources of information, key informant interviews and surveys. Some examples are given in Table 2.5.

2.4.4 Criteria and indicators for sustainable forest management

Prabhu *et al*. (1999) report on the development of criteria and indicators for sustainable forest management as a result of a number of initiatives growing out of the 1992 Forest Principles agreed at the Earth Summit. The Centre for International Forestry Research has produced a generic list drawing on these initiatives, which include issues of forest management relevant to the poor. Table 2.6 shows some of these indicators.

Prabhu *et al*. (1999) define a criterion as 'a principle or standard that a thing is judged by' (p. 86), and an indicator as 'any variable or component of the forest ecosystem or management system used to infer the status of a particular criterion' (p. 87). The generic indicators have been tested and adapted in a number of settings . A 'Criteria and Indicators ToolBox' series of reports is available via the CIFOR website (www.cifor.org).

Table 2.6 Examples of Criteria and Indicators Contributing to Sustainable Forest Management

Criterion	Indicator
Legal framework protects forest resources	Security of tenure (includes status of length, exclusivity, enforceability and transferability) Existence of property rights for exploited non-timber forest products (e.g. fuelwood)
Local management is effective in controlling maintenance of and access to resources	Ownership and use rights to resources (inter- and intra-generational) are clear and respect pre-existing claims Rules and norms of resource use are monitored and enforced Access to forest resources is perceived locally to be fair Local people feel secure about access to resources
Forest actors have a reasonable share in economic benefits derived from forest use	Mechanisms for sharing benefits are seen as fair by local communities Opportunities exist for local and forest-dependent people to receive employment and training from forest companies
Local stakeholders have detailed, reciprocal knowledge pertaining to forest resource use (including user groups and gender roles), as well as forest management plans prior to implementation	Plans/maps showing integration of uses by different stakeholders exist Baseline studies of local human systems are available and consulted Management staff recognise the legitimate interests and rights of other stakeholders Management of NTFP reflects the interests and rights of local stakeholders
Forest management plan available	Management takes place with appropriate involvement of the stakeholders and takes into account all the components and functions of the forest, such as timber production, NTFP, ecology and well-being of local populations

See Prabhu *et al*. (1999, pp. 151–154) for complete list.

2.4.5 Livelihood monitoring system

Turton (2000) reports on the preliminary development of a livelihood monitoring system for two DFID–Bangladesh projects under the Fisheries and Aquatic Resources and Natural Resources programmes. The aim of this system is to monitor the broader impacts of these projects on the livelihoods of the poor, partly through developing and monitoring key livelihood indicators over time. The system is informed by the sustainable livelihoods approach, and the indicators initially identified are set out in Table 2.7.

2.5 Developing Poverty–Environment Indicators

From a review of environmental issues of relevance to the poor, poverty–environment indicators are most relevant for:

- environment and health (including malaria, diarrhoea and respiratory problems, particularly arising from indoor air pollution)
- forest cover
- soil degradation
- water quantity and quality
- fisheries
- natural disasters.

Table 2.7 Livelihood Indicators

INDICATOR	VARIABLES
Vulnerability	
Seasonality	• Most difficult time of the year? Food stocks
Shocks/assets	• Dowry; river erosion; cyclone; pest/disease attacks; rainfall patterns; illegal possession of land
Resource trends	• Permanent and seasonal migration; reduced income opportunities
Assets	
Land/trees	• Owned/rented/leased
Water	• Access to irrigation facility (shallow tubewell/deep borewell)
Livestock	• Number of adult/young cow/buffalo/goat/poultry/ducks; owned or shared
Physical assets	• Housing condition/furniture; bicycle, radio, TV; agricultural equipment; number in household; old age dependency ratio; literacy levels; disabled member; female-headed. Type of health service used (family welfare centre; private doctor); purchase of prescription
Financial	• Remittances; saving/loan status
Transforming structures and processes	
Local networks	• Participation in community activity; membership of indigenous organisations; contact with other NGOs; access to financial institutions; access to extension; access to NGO loans
Marketing	• Who participates? Nature of marketing – private company, middlemen, individual initiative, exchange within village
Caste	• For Muslims as well as Hindus?
Gender	• Frequency of women coming together; movement within and outside community; level of control over household decisions
Conflict	• Involved in any conflict with household within the village?

Table 2.7 Livelihood Indicators

INDICATOR	VARIABLES
Strategies	
Income sources/time allocation	• Homestead agriculture; field agriculture; daily field labour; daily town labour; selling fodder grass; wholesale business; fruit and vegetable production; rickshaw pulling; short-term migration; poultry rearing; cattle rearing; selling milk in market; small business – fried rice selling
Coping strategies	• Selling land; ornaments; draft animals; tin sheets; trees; utensils; loans; child/women labour; migration to towns; illegal felling
Adapting strategies	• New activities–diversification; migration
Labour	• Number of days sold by gender; contract arrangement – advance selling; wage rate in peak and lean periods
Investment	• Are you saving? Loan/savings use
Outcomes	
Food security	• Number of months from own production. In difficult months – can you feed adequately – number of meals/day
Education	• Number of children in school; number of years in school
Environment /sustainability	• Use of pesticides/fertiliser; number of trees per household; livestock-to-land ratio; use of organic matter – fuel versus field; access to common property resources; energy use
Health	• Under-5 wasting; under-5 stunting; body mass index; incidence of diarrhoea; night blindness; skin disease; medical expenses
Expenditure	• Eid expenditure
Women's empowerment	• Frequency of women coming together; movement within and outside community; level of control over household decisions

Source: Turton (2000).

The review of indicator initiatives also highlights a number of recurrent themes, including tenure and property rights, and access to drinking water and sanitation. The selection of indicators is also guided by the use of the environmental entitlements framework and the sustainable livelihoods framework, as the poor are affected by most of the issues set out above due to difficulties in accessing and controlling resources. Improving environmental conditions to reduce poverty may not be a technical matter, rather one involving changing institutions and policy instruments, for example.

The development of generic indicators draws on the approaches summarised in section 1.6, particularly:

- relating indicators to overall targets
- drawing on participatory exercises in the absence of participation of key stakeholders, via a review of environmental issues raised by the poor through PPAs (World Bank, 2000a)
- ease of access to information or data collection.

2.5.1 Targets

Developing a set of generic indicators suggests there is no set target or goal. This study has chosen two of the DAC targets – economic well-being and environmental sustainability and regeneration – as targets for a set of indicators. These targets can guide (and narrow) the selection of indicators, and illustrate how indicators feed into targets.

The economic well-being target is:

'A reduction by one-half in the proportion of people living in extreme poverty by 2015.'

The environmental and sustainable development target is:

'There should be a current national strategy for sustainable development, in the process of implementation, in every country by 2005, so as to ensure that current trends in the loss of environmental resources are effectively reversed at both global and national levels by 2015.'

These targets lead to the selection of indicators that reflect a positive relationship between environmental improvement and poverty reduction – a 'win–win' situation where environmental improvement contributes to poverty reduction. The DAC (1999) definition of national strategies for sustainable development is that they are 'a strategic and participatory process of analysis, debate, capacity strengthening, planning and action towards sustainable development'. DFID (2000a, p. 11) suggests that a national strategy for sustainable development 'represents the policies, plans, processes and actions that a country is taking to move towards sustainable development', which could be 'a single umbrella strategy … or the aggregate of a range of co-ordinated, existing strategic planning approaches.'

2.5.2 The generic indicators

From an analysis of the issues raised in the PPAs reviewed by Voices of the Poor (World Bank, 2000a), and informed by the issues and indicators discussed above, a set of generic poverty–environment indicators developed for pilot testing in three countries is set out in Table 2.8. The table identifies the environmental issues raised by the poor, discusses how these are manifested, and suggests appropriate indicators. Building on this, Table 2.9 sets out what national/local definitions would be needed to further refine the indicators, where generic definitions would be meaningless.

How representative these issues are may be questioned, as PPAs do not claim to generate statistically relevant data. The issues raised in the PPAs reviewed do reflect the findings reviewed in section 2.2, and are similar to issues being explored by other indicator exercises (section 2.4).

Table 2.8 Generic Poverty–Environment Indicators

Issues arising from PPAs	Manifestation	Relation to environmental factors	Poverty–environment indicator(s)
Food security and ownership of or access to land	Concern over ability to feed family, including seasonal fluctuations affecting prices and incomes	Access to good land and productivity of land	Proportion of the poor with secure use rights to land for farming Percentage of poor farmers with access to x hectares to grow food for household consumption
Power and voice	Including access to good land and women's access to sanitation facilities (women feel harassed and vulnerable), with implications for disease incidence	Ability to decide how to use and manage natural resources Availability of adequate excreta disposal facilities has implications for environmental health	Area of forests co-managed by user groups with representatives of the poor Access to sanitation facilities by women
Water security	Water is most important for bathing and drinking; less time available for women to draw on other livelihood assets and for children to attend school	Water management regimes conserve resources	Hours spent per day collecting water by women and children living in rural areas (noting seasonal variations) Percentage of household income spent on water in urban areas
Agricultural productivity	Particularly access to water for irrigation so that dry-season farming can improve food security	Water management regimes to conserve water and prevent salinisation of irrigated areas	Percentage of poor farmers with access to sustainable irrigation facilities
Substandard housing	Lack of maintenance and types of materials used by necessity contribute to vulnerability	Environmental health issues Vulnerability to disasters and flooding	Percentage of people living in substandard housing (rural and urban figures) Density of housing in urban areas
Illness	Devastating and lasting drain on household resources	Environmental conditions of housing and neighbourhood, including cleanliness and access to water	Proportion of health burden of the poor related to environmental factors – disease incidence related to environmental factors disaggregated by age (vulnerability of children under 5, for example)

Table 2.8 Generic Poverty–Environment Indicators

Issues arising from PPAs	Manifestation	Relation to environmental factors	Poverty–environment indicator(s)
Living in environmentally fragile areas, such as arid and tropical lands with limited soil fertility	Poor people can no longer afford to leave land fallow, which further reduces fertility and yields; with no access to other lands, increasing numbers of poor people have also moved to steep hillsides and low-lying coastal areas	Resource degradation including erosion, reduced soil fertility, depleted marine and forestry resources, and declining availability of fresh water	Proportion of the poor living in ecologically fragile areas Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture (either subsistence agriculture or farm labouring?) Access to non-farm sources of livelihood for the poor living in ecologically fragile areas
Access to common property resources by women, especially water, fuelwood and NTFPs	Many traditional coping strategies such as gathering wood, hunting 'bushmeat', fishing and harvesting herbs, fruits, or nuts rely on common resources. Pressure on such resources is intensifying and several studies document that these resources are disappearing. Women are much more dependent on gathering forest resources, and the disappearance of non-timber forest products disproportionately affects their well-being.	Deforestation and declining fish stocks	Hours spent per day/week collecting fuelwood by women and children in rural areas Percentage of household income spent on fuel in urban areas Percentage of common property land available to women for collecting fuelwood and non-timber products Percentage of poor fisherfolk with access to adequate fish catches
Natural disasters	Vulnerability exacerbated by natural disasters, overwhelming traditional coping mechanisms	Vulnerability exacerbated by living in vulnerable areas Changing climatic conditions exacerbate vulnerability of countries	Percentage of the population living in areas prone to flooding Number of poor people killed by environmentally related disasters Number of poor people made homeless by environmentally related disasters

Where indicators refer to poor groups, these should be defined, using information from national PPAs or other documents. Definitions could include: $1 a day, national poverty line, groups identified as vulnerable in PPAs and other documents, rural/urban distinctions, poor regions/districts.
Vulnerability due to seasonal fluctuations, particularly in food and water availability, increases vulnerability, particularly for rural communities. Fetching water may take more time, for example, and in the rainy season, grain prices rise, access to casual labour drops and flooded streets limit informal commerce. Seasonal variations in indicators are sought where appropriate.

Table 2.9 Definitions of Terms and Potential Data Sources for Generic Indicators

Poverty–environment indicator(s)	National/local definitions needed	National ministries and statistical bureaux
Potential sources of information Proportion of the poor with secure use rights to land for farming	Who are the poor? What are secure use rights?	National legislation
Percentage of poor farmers with access to x hectares to grow food for household consumption	How many hectares would be considered sufficient for subsistent production of food for an average household's consumption?	PPA – establish whether rights exist (traditional and/or legislative) and benefit the poor (variations may exist within countries) PPA exercises could generate information on how land area has changed over the years and whether subsistence farmers can obtain enough from their land for their households' livelihood
Area of forests co-managed by user groups with representatives of the poor	What types of co-management regimes for forests exist?	National ministries and statistical bureaux
Access to sanitation facilities by women	What does 'access' entail (distance, cost) and what types of sanitation facilities?	National ministries and statistical bureaux Information from PPAs could supplement quantitative indicators in terms of nature of co-management of forests and access to sanitation facilities (distance, reliability, costs, etc.)
Hours spent per day collecting water by women and children living in rural areas (noting seasonal variations)		UNICEF multiple indicator cluster survey data National ministries and statistical bureaux PPA – focus groups, household questionnaires
Percentage of household income spent on water in urban areas		
Percentage of poor farmers with access to sustainable irrigation facilities	How are poor farmers defined (size of land-holdings, yield, etc.)? What are sustainable irrigation facilities?	National ministries and statistical bureaux PPA – questions on access to irrigation facilities
Percentage of people living in substandard housing (rural and urban figures)	What is substandard housing?	Government department with responsibility for housing
Density of housing in urban areas		

Table 2.9 Definitions of Terms and Potential Data Sources for Generic Indicators

Poverty–environment indicator(s)	National/local definitions needed	National ministries and statistical bureaux
Proportion of health burden of the poor related to environmental factors – disease incidence related to environmental factors disaggregated by age (e.g. vulnerability of children under 5)	Health burden – what factors have been identified as most critical in the country? Where do environmental factors come in?	National ministries and statistical bureaux WHO World Development Indicators
Proportion of the poor living in ecologically fragile areas Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture (either subsistence is agriculture or farm labouring?) Access to non-farm sources of livelihood for the poor living in ecologically fragile areas	What are ecologically fragile areas?	National ministries and statistical bureaux PPAs and national household surveys which include information on occupations and livelihood sources
Hours spent per day/week collecting fuelwood by women and children in rural areas Percentage of household income spent on fuel in urban areas Percentage of common property land available to women for collecting fuelwood and non-timber products Percentage of poor fisherfolk with access to adequate fish catches	Size of adequate fish catch	UNICEF multiple indicator cluster National ministries and statistical bureaux PPA – focus groups, household questionnaires Seasonal variations should be noted Variations within country should be recorded if possible PPA exercises could include questions on access to fish stocks by poor fisherfolk: how has access changed over time due to factors including declining stocks of certain fish species?
Percentage of population living in areas prone to flooding Number of poor people killed by environmentally related disasters Number of poor people made homeless by environmentally related disasters	Nationally recognised areas prone to flooding Recorded disasters associated with environmental factors Homelessness (in relation to indicator)	Government department with responsibility for flood control and disasters

2.6 Data Sources

Table 2.9 also presents some suggestions regarding potential data sources. Existing data sets should obviously be explored, although information regarding the method of collection would be needed, particularly if comparisons are going to be made between and within countries. In some international data sets the methodologies have been agreed, easing comparisons. International data sets include data collected by the World Health Organization (WHO) and by the UNDP's Human Development Index. Some of the World Development Indicators are also relevant.

It may be possible to refine or add to data-collection exercises, such as living standard surveys and PPAs, where poverty–environment goals and indicators have been agreed. Government ministries and national bureaux of statistics may have some relevant information, although donor agencies, non-governmental organisations and academic institutes may also undertake relevant data-collection exercises.

Many of the generic indicators could make use of both quantitative and qualitative data, particularly where such data can complement each other, providing a better understanding of the contribution of that indicator to poverty reduction.

2.7 Conclusions

This chapter sets out a list of generic poverty–environment indicators for pilot testing. These reflect the environmental priorities of the poor, determined from a review of PPAs conducted by the World Bank, as well as other sources. The list of indicators has some commonalities with the other indicator initiatives reviewed, illustrating the increasing interest in this area of assessment and suggesting that there may be potential for data collection and sources to be shared in future work.

This set of generic indicators provides a pool from which more local, country-specific indicators can be drawn. They are developed without reference to set goals and targets, other than to reduce poverty, and need to be refined further to reflect country goals and targets.

3.1 Introduction

This chapter reviews the findings of pilot tests of the indicators in Uganda, Nepal and Nicaragua. Detailed reports from the country studies are provided as Annexes A–C. The reports build on the generic indicators, and set out country-specific indicators that reflect the situation of the poor in each country; the relevance of environmental resources for their livelihood strategies; and the sources of data available.

3.2 Application of Generic Indicators

All the country studies modified the wording of many of the indicators (Table 3.1), reflecting the specific situations. But the country studies did not introduce completely new indicators, suggesting that the generic indicators are representative of environmental issues relevant to the poor. Some of the indicators were not relevant to the countries (fishing in Nepal, for example). As the indicators have been reworded, comparing the values of indicators between countries does become difficult. There are also differences in the availability and collection of data.

The differences include:

- existence of more than one definition and measurement of poverty within a country, as well as between countries, increasing the difficulty of comparing between countries and over time
- different priorities and issues (for example, the definition of fragile areas is country-specific) which results in different wording and values for the indicators
- year, frequency and methods of data collection.

Does this mean cross-country comparisons are irrelevant? The country researchers have been able to retain the same wording for some indicators, which should facilitate comparisons, although not enough information on data collection methods has been given to assess comparability. But it is much harder to draw meaningful comparisons between more specific country indicators. Comparability can be developed where there is agreement across countries on data collection and definition, for example, for some health indicators, World Development Indicators, and some DAC target indicators. This would require long-term commitment and resources to develop, if it were deemed worthwhile.

A further complication in the wording of the generic indicators is the local (or country-specific) interpretation of some terms, such as ‘adequate’, ‘sustainable’ and ‘substandard’. In some cases the country studies have been able to provide clearer definitions. The generic indicator 'percentage of people living in substandard housing', for example, has been refined in the case of Uganda to 'percentage of poor people living in temporary shacks without adequate ventilation'. The development of country-specific (or region-specific) poverty–environment indicators should make use of local interpretations of what is ‘adequate’ or ‘sustainable’, where these are available.

Table 3.1 Generic and country indicators

Poverty-environment indicator(s)	Uganda	Nepal	Nicaragua
Proportion of the poor with secure use rights to land for farming Percentage of poor farmers with access to x hectares to grow food for household consumption	Proportion of poor people with secure access to land Percentage of poor with own land	Percentage of landless poor Average cultivated area of poor Average area with tenancy right of the poor	
Area of forests co-managed by user groups with representatives of the poor Access to sanitation facilities by women	Proportion of forested areas (forest reserves) that are co-managed with the poor Proportion of poor women with access to adequate sanitation facilities	Percentage of forests managed by user groups with the representative of the poor Access to sanitation	Percentage of the poor working in areas of forest co-managed Percentage of poor people with access to sanitation facilities
Hours spent per day collecting water by women and children living in rural areas (noting seasonal variations) Percentage of household income spent on water in urban areas	Percentage of the poor with access to safe drinking water Percentage of the poor with adequate water for livestock Amount of time spent by the poor collecting water Distance travelled by the poor to collect water	Percentage of the poor with access to safe drinking water Amount of time spent by the poor collecting water Distance travelled by the poor to collect water Percentage of the poor with access to safe drinking water	Percentage of the poor with adequate water for livestock Amount of time spent by the poor collecting water Distance travelled by the poor to collect water
Percentage of poor farmers with access to sustainable irrigation facilities		Percentage of irrigated area in total cultivated area of the poor	
Percentage of people living in substandard housing (rural and urban figures) Density of housing in urban areas	Percentage of poor people living in temporary shacks without adequate ventilation Percentage of poor people sharing the same place of abode with livestock Percentage of poor with	substandard housing Average house space per household	Percentage of poor people living in substandard housing (rural and urban areas)
Proportion of the health burden of the poor related to environmental factors – disease incidence related to environmental factors disaggregated by age (e.g. vulnerability of children under 5)	Incidence of malaria among the poor Incidence of cholera among the poor Incidence of typhoid fever among the poor	Immunisation coverage Infant mortality rate Child mortality rate Maternal mortality rate Use of health facilities Time taken to travel to nearest health facility for the poor Access to health facilities or trained birth attendant during childbirth	Incidence of malaria among the poor Incidence of cholera among the poor Incidence of typhoid fever among the poor

Table 3.1 Generic and country indicators

Poverty-environment indicator(s)	Uganda	Nepal	Nicaragua
Proportion of the poor living in ecologically fragile areas Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture (either subsistence agriculture or farm labouring?) Access to non-farm sources of livelihoods for the poor living in ecologically fragile areas	Percentage of the poor living on marginal land such as fragile highland areas Percentage of the poor living on marginal land such as wetlands Percentage of the poor living on agriculturally unproductive land Percentage of the poor living on highly degraded land (through soil erosion)	Percentage of the poor living on marginal land such as ecologically fragile highland areas, riverside areas Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture	Percentage of the poor living on marginal land such as fragile highland areas Percentage of the poor living on marginal land such wetlands Percentage of the poor living on agriculturally unproductive land Percentage of the poor living on non-farm sources in ecologically fragile areas
Hours spent per day/week collecting fuel wood by women and children in rural areas Percentage of household income spent on fuel in urban areas Percentage of common property land available to women for collecting fuelwood and non-timber products Percentage of poor fisherfolk with access to adequate fish catches	Percentage of the poor using firewood and charcoal as major source of energy Time spent collecting firewood by the poor per week Percentage of poor women with access to common property land for collecting fuelwood and other non-timber products (Access is defined as freedom to obtain fuelwood from common property at no cost and without restriction.) Amount of fish catch per day per fisherman in poor fishing communities	Percentage of the poor using firewood, straw, thatch, cow dung, leaves, etc. Time spent collecting firewood by the poor Percentage of poor women with access to common property land for collecting fuelwood and other non-timber products	Percentage of the poor using firewood and charcoal as major source of energy Time spent collecting firewood by the poor Percentage of poor women with access to common property land for collecting fuelwood and other non-timber products Amount of fish catch per day per fisherman
Percentage of population living in areas prone to flooding Number of poor people killed by environmentally related disasters Number of poor people made homeless by environmentally related disasters	Percentage of poor people living in flood-prone areas Number of the poor displaced by landslides Number of the poor displaced by earthquakes	Percentage of poor people living in flood-prone areas Number of deaths due to environmental disasters Number of the poor displaced by landslides Number of the poor displaced by fire	Percentage of poor people living in flood-prone areas Number of the poor displaced by land slides Number of the poor displaced by earthquakes Percentage of people made homeless by environmentally related disasters

3.3 Sources of Information

Values have been found for most of the indicators, so there are some data already available to explore linkages between poverty and the environment. But some of the values given do not directly correlate to the indicator; for example, some of the figures are not specific to the poor or to women. The values stated, though, do provide a picture of the kind of data available. As expected, there appear to be data available for the environmental health indicators, access to safe water and sanitation, although the figures are not always specific to the poor. Only the Nepal study was able to find data on indicators relating to access to land, co-management of forests, housing, and environmentally related natural disasters. Data on reliance on ecologically fragile land was not readily available in any of the studies.

Uganda has a number of actual and potential sources of data, following the development of the PRSP. The report in Annexe A discusses these sources of data. It appears that, with the development of PRSPs and efforts to generate relevant data, there may be opportunities to generate a better understanding of the relationships between poverty and environment.

Dyble (1999) reported on a statistical stock-taking exercise undertaken in Nepal to assess the availability of data for assessing progress towards the DAC targets. He sets out a number of data sources which were used in this pilot test, including the Nepal Living Standards Survey (NLSS), a household survey collecting information on housing and health, for example. Dyble (1999) notes that there has been no poverty line agreed by the Government of Nepal, and very little data collected on environmental indicators. The report on Nepal in Annexe B made particular use of the NLSS, as well as data from government ministries, including Land Reform, Agriculture, Water Resources and Housing and Physical Planning. The Nepal table contains more values for the indicators than Uganda and Nicaragua.

Nicaragua appears to have fewer sources of information, those available being the National Census (every 10 years), the National Survey of Homes (every 2 years), and some specific studies. As more emphasis is being placed on poverty reduction initiatives, more relevant data may be collected in future surveys.

3.4 Usefulness of Generic Indicators

For the indicators to be meaningful they need to relate to, and track progress towards, specific targets and policies relating to poverty reduction. Although the DAC targets are a useful starting point for the indicators, they need to be broken down to more specific targets. There is now perhaps more scope to do this and develop appropriate poverty–environment indicators through the PRSP initiative, which could draw on the generic indicators. The indicators could then be used to assess how certain policies and initiatives are contributing to poverty reduction.

Many of the indicators readily suggest the direction in which progress should be made. Alleviating poverty implies a reduction in the number of hours spent per day fetching water or fuelwood, for example. Some of the indicators could be interpreted in a number of ways: while it is true that poorer people in rural areas are more likely to be reliant on common property resources, greater reliance could indicate increasing poverty, or it could imply improved access to those resources,

thereby alleviating poverty. This dilemma reiterates the need for clear goals and targets to which the indicators relate. Such goals and targets should be agreed before selecting relevant indicators, and the movement of the indicators over time should relate to progress towards the target and overall goal.

3.5 Weaknesses of the Generic Indicators

One of the weaknesses of using generic indicators is that they do not capture the complexity of the relationships between poverty and environment. The indicators simplify the relationships and make generalisations. But at least the indicators have the advantage of recognising the complexities of the relationships by breaking them down, informed by knowledge of the experiences of the poor themselves. The development of any set of indicators will be a compromise between the relationships of concern and the ability to collect appropriate data.

3.6 Further Development of the Indicators

The generic list of poverty–environment indicators represents a pool of potential indicators that can be drawn on in relation to agreed targets and goals, where the aim is to reduce poverty while protecting the environment. Further refinement at country level would make the indicators more specific and less ambiguous in some cases. The indicators can be made 'SMARTer', using the desired SMART characteristics of indicators set out in Table 1.1.

The development and use of poverty–environment indicators is likely to continue with further developments in PRSPs. This study provides one approach and set of indicators, with country-specific examples. Further work is needed, particularly on exploring existing and potential data sources and consequent resource requirements.

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ANNEXE A
POVERTY – ENVIRONMENT INDICATORS FOR UGANDA

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A.1 Background and Rationale

The contribution of the environment to human well-being in Uganda (as in many other developing countries) is now explicitly recognised. This is partly due to research and documentation by Ugandan scholars demonstrating that environmental and natural resource inputs significantly contribute to human well-being (NEMA, 1998); and that on the other hand, deterioration of the quality and quantity of environmental resources worsens the condition of poor people. The relationship between poverty and environment in Uganda is best understood in the context of people's livelihoods. Over 85% of Uganda's population live in rural areas and are employed in natural resource-based activities, especially agriculture (GoU, 2000).

Despite the above, Uganda still lacks a systematic framework for tracking the relationship between poverty and environmental degradation (Driver and Moyini, 2001). Overall, there is little understanding of the true cost to the economy of environmental degradation and the depletion of natural resources (Slade and Weitz, 1991). This lack of information makes it difficult for policy-makers to fully appreciate environmental concerns and give them due weight. Environmental considerations are not adequately addressed in the government's overall planning framework, the Poverty Eradication Action Plan (PEAP) (Driver and Moyini, 2001).

This report sets out the findings from a short study commissioned by the UK Department for International Development through the School of Public Policy of the University of Birmingham to pilot test the use of generic poverty–environment indicators for use in initiatives such as the PEAP. The broad aim of the report is to assess the generic indicators, and put forward country indicators that relate environmental conditions to the livelihood strategies of poor people in Uganda. The report draws on poverty assessments undertaken in Uganda, particularly the 2000 report of the Uganda Participatory Poverty Assessment Project, and assesses potential data sources for poverty–environment indicators.

A.2 Country Profile

Poverty eradication is a fundamental objective of Uganda's development strategy for the next two decades, and the government has resolved to reduce the proportion of the population living in absolute poverty to 10%, and of those in relative poverty to 30%, by the year 2017. The PEAP forms the framework for poverty eradication in Uganda. It adopts a multi-sectoral

approach, recognising the multi-dimensional nature of poverty and the linkages between influencing factors. The priorities for poverty eradication set by the PEAP are primary healthcare, rural feeder roads, education, water, and the modernisation of agriculture, especially through research and extension.

A.3 Characteristics of Poverty in Uganda

In 1997, the Government of Uganda adopted a focused definition of poverty, emphasising basic needs and provision of services. Government defined poverty as lack of access to basic necessities of life, including food, shelter, clothing and other needs including education and health. They further calibrated measurements of poverty based on consumption expenditure as a proxy for income, in line with data generated from annual household surveys conducted by the then Statistics Department since 1992.

In the Ugandan context, poverty is measured against an absolute poverty line which reflects the monetary cost of meeting certain basic requirements of life. The approach focuses on defining food-related needs, and only indirectly estimates non-food requirements. The measurement of food-related needs was based on the WHO-recommended calorific requirement of 3000 calories for adult men (18–30 years of age) engaged in moderate work and eating a typical diet of poor Ugandans, and was found to be Ushs11 500 per month (US$0.33 per day). US$0.33 per day (which is less than the generally quoted US$1 per day) is therefore the food poverty line (also called the hard-core poor). The cost of non-food requirements was also estimated for those not in hard-core poverty, and was found to be equal to Ushs16 400 per month or US$0.47 per day (called the absolute poverty line).

The PEAP recognises that poverty has many dimensions, including 'low and highly variable levels of income and consumption, physical insecurity, poor health, low levels of education, disempowerment, a heavy burden of work or unemployment, and isolation (both social and geographic)' (MFPED, 2000a, p. 8). The IMF and International Development Assistance suggest that 'poverty in Uganda is predominantly a rural phenomenon, most intense outside the central region, and is most prevalent and intransigent among food crop farmers, a majority of whom are women' (MFPED, 2000a, p. 6).

Consumption data are considered preferable to income data for calculating poverty status, 'because the latter are very difficult to record accurately, for a number of conceptual, methodological and practical reasons' (McGee, 2000, p. 6). According to Appleton (2001), consumption data reveal that 35% of the population (approximately 7.7 million people) cannot meet their basic needs.

The participatory exercises undertaken for the PPA revealed that poverty 'varies with geographic location, type of community, age, gender, and the existing levels of service and infrastructure' (MFPED, 2000a, p. 4). Table A1 sets out the key characteristics of poverty as identified through the participatory exercises, illustrating the broad understanding and experience of poverty.

Table A1 Manifestations of Poverty

Level	Characteristics of poverty
Household	Without productive assets, income and basic necessities
Group	Certain groups are perceived as more vulnerable to poverty than others, including the landless, casual labourers, women, widows, widowers with children, orphans and neglected children, youth and the elderly, the chronically sick, the disabled, displaced and refugees, people living in areas prone to natural calamities, and large families Community Lacks adequate basic services and infrastructure, has few livelihood opportunities, or is affected by insecurity

Source: MFPED (2000, p. 4).

The PPA consultation also confirmed that people move in and out of poverty, and that seasonal considerations are particularly important, leading to times of abundance and times of hardship throughout the year.

It was also found that gender roles influenced women's and men's perceptions of poverty, with women focusing on household issues (including food and water availability) and men, as the traditional income earners, focusing on their responsibilities for providing for the family and community.

A.4 Relative Significance of the Environment for the Poor

The Uganda Participatory Poverty Assessment Project noted a number of factors responsible for the condition of the poor. These included productivity of land, access to education, access to credit, access to agricultural inputs, access to land, access to important natural resources including forest products, access to safe water, and access to sanitation facilities, among others. Poor health and disease were the most frequently mentioned factors across all communities in the PPA, as both a cause and a result of poverty.

The MFPED (2000a) report quoted land, water and forests as the principal natural resources discussed by local people. Lack of access to land, in particular, was a frequently mentioned constraint to improving productivity and securing livelihoods. The PEAP cites research showing considerable inequality in accessing land; the Land Act has been designed to strengthen the land rights of the poor, although women's rights need to be strengthened further (MFPED, 2000). Natural resource degradation, particularly with regard to the ability of the soil to produce food, was quoted as the most central constraint to increasing production and securing livelihoods.

The need for clean drinking water for people and livestock was also frequently mentioned. Women consistently ranked inaccessibility of safe water for drinking as one of their top 10 community priority problems. Communities considered water from taps, protected springs and boreholes as safe for drinking (MFPED, 2000b, p. 30). Problems identified as resulting from the lack of adequate access to clean water included long distance to a 'clean source', the high cost of buying water, time wasted by women and school missed by children, and diseases (leading to low productivity and a burden on women caring for the

sick). Many rural communities have to travel between 2 and 15 km to collect safe water, and seasonal variations in the availability of water were noted.

It was reported through the PPA that latrine coverage and usage was low in all communities, in all districts, and this was linked to outbreaks of diseases such as cholera. Forests were more important in some places than others, for reasons ranging from fuelwood to tourism. McGee (2000, p. 14) suggests that 'fuelwood, water and medicines which could once be gathered from the bush or communal land often have to be paid for now that environmental degradation and population density have reduced their availability or environmental legislation has proscribed the exploitation of such resources.' She also suggests that environmental changes are contributing to a decline in food security through climatic shocks and worsening crop yields.

This brief review identifies a number of environment and natural resource issues that are of relevance to the well-being of poor people. But no framework exists to track the relationship between environmental conditions and access to important natural resources and poverty. The poverty–environment indicators proposed below should contribute to the information needed for developing an effective monitoring mechanism.

A.5 Pilot Testing Generic Poverty–Environment Indicators

The generic indicators developed by University of Birmingham indicators have been revised in light of the review above, noting the particular characteristics of poverty in Uganda and the relative significance of environmental conditions to the poor.

The generic indicators are relevant to the broad aspects they represent, and can be used to compare poverty and environmental conditions across large geographical areas, such as countries. Within Uganda, generic indicators cease to be of great relevance and do not help much in informing policy. This pilot test suggested that the indicators in the table will need to be further tailored to district and sub-county levels, to cater for variations in poverty and environmental conditions. Poverty assessments in Uganda indicate that the causes of poverty are location-specific, and therefore indicators that are of relevance must be locally generated, measured and monitored over time to track changes. Existing and potential data sources, and the values that could be obtained, are given in Table A2.

Table A2 Proposed Poverty and Environment Indicators (Uganda)

Generic indicator(s)	Country indicator(s)	Rationale for country indicator(s)	Data source	Value (level) of indicator
Proportion of the poor with secure use rights to land for farming Percentage of poor farmers with access to x hectares to grow food for household consumption Proportion of the poor living in ecologically fragile areas Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture (either subsistence agriculture or farm labouring?) Access to non-farm sources of livelihood for the poor living in ecologically fragile areas	Percentage of the poor living on marginal land such as fragile highland areas Percentage of the poor living on marginal land such as wetlands Percentage of the poor living on agriculturally unproductive land Percentage of the poor living on highly degraded land (through soil erosion) Proportion of poor people with secure access to land	Uganda has a Land Act (1998), but has no land-use policy, so the poor who have no means of acquiring productive land tend to move to marginal land such as wetlands and fragile hillsides Densely populated areas also tend to have these characteristics, although not necessarily the poor alone	Uganda Bureau of Statistics Ministry of Agriculture, Animal Industry and Fisheries Ministry of Water, Lands and Environment	National-level figures are non-existent

Generic indicator(s)	Country indicator(s)	Rationale for country indicator(s)	Data source	Value (level) of indicator
Percentage of poor farmers with access to sustainable irrigation facilities Hours spent per day collecting water by women and children living in rural areas (noting seasonal variations) Access to sanitation facilities by women	Percentage of the poor with access to safe drinking water Percentage of the poor with adequate water for livestock Amount of time spent by the poor collecting water Distance travelled by the poor to collect water Proportion of poor women with access to adequate sanitation facilities	Water provision by the major water public utility – the National Water and Sewerage Corporation – is limited to major urban centres leaving rural communities dependent on localised water sources including protected and unprotected springs, ponds, dams and open rivers, with many communities using unsafe, long-distance and seasonal sources of water The sewerage service is limited to a few urban centres – even there, the service is old and inefficient, and many depend on household-based sewerage-management units including pit latrines and septic tanks 42% of the rural population and about 26% of the urban population lack adequate sanitation – in urban areas many latrines are overused, poorly maintained and (due to population density) the risk of infectious diseases is exponentially high	Ministry of Health Ministry of Water, Lands and Environment (MWLE) Rural Water and Sanitation Project (MWLE) Uganda Bureau of Statistics (UBoS) Ministry of Finance, Planning and Economic Development Economic Policy Research Centre (MFPED) MFPED (date?)	Percentage of rural population with access to safe water – 41% (1998), 50% (2000) Percentage of rural population with access to sanitation – 45% (1998), 65% (target 2005) Distance to water source for rural households – 1 km Distance for water for livestock – 1°km

Generic indicator(s)	Country indicator(s)	Rationale for country indicator(s)	Data source	Value (level) of indicator
Area of forests co-managed by user groups with representatives of the poor Hours spent per day/week collecting fuelwood by women and children in rural areas Percentage of common property land available to women for collecting fuelwood and non-timber products	Proportion of forested areas (forest reserves) that are co-managed with the poor Percentage of the poor using firewood and charcoal as major source of energy Time spent collecting firewood by the poor per week Percentage of poor women with access to common property land for collecting fuelwood and other non-timber products *(access is defined as freedom to obtain fuel wood from the common property at no cost and without restriction)*	Up to 90% of Uganda's population depend on firewood as a source of cooking and heating energy – the reducing supply of firewood in many areas is a critical factor for livelihoods and general well-being; in drier areas many poor households depend on tree-cutting to burn charcoal to sell, which leads to further environmental degradation and more poverty	Ministry of Finance, Planning and Economic Development Statistical Abstract 2000 (UBoS) Ministry of Energy and Minerals	97% of population depend on fuelwood and charcoal Wood used as fuel by households was 65% of total wood use in 1999
Percentage of poor fisherfolk with access to adequate fish catches	Amount of fish catch per day per fisherman in poor fishing communities	The fisheries sector is an increasingly important contributor to foreign exchange earnings and employment – but fisheries resources are rapidly running out in the face of fishing pressure, with a loss of important sources of livelihood for poor fisherfolk who have no opportunity to move to more gainful employment	EPRC, 1999	National fish catch declined by 22% between 1993 and 1994, from 276 000 to 21 300 tonnes, respectively, and has remained at the latter level to date

Generic indicator(s)	Country indicator(s)	Rationale for country indicator(s)	Data source	Value (level) of indicator
Proportion of the health burden of the poor related to environmental factors – disease incidence related to environmental factors disaggregated by age (e.g. vulnerability of children under 5)	Incidence of malaria among the poor Incidence of cholera among the poor Incidence of typhoid fever among the poor	Although not backed by solid figures, the link between environmental sanitation and the incidence of diseases in Uganda is strong, yet ill-health is the main cause of poverty, denying poor people the opportunity to eke out a living in addition to imposing on them the direct cost of healthcare	Ministry of Health Statistical Abstract 2000 (UBoS)	Morbidity due to malaria was 36% of outpatients in 1999 Morbidity due to diarrhoea diseases was 5% of outpatients in 1999
Percentage of people living in substandard housing (rural and urban figures)	Percentage of poor people living in temporary shacks without adequate ventilation Percentage of poor people sharing the same place of abode with livestock	Many housing units in Uganda are owner-constructed and of very poor standard		
Percentage of population living in areas prone to flooding Number of poor people killed by environmentally related disasters Number of poor people made homeless by environmentally related disasters	Percentage of poor people living in flood prone areas Number of the poor displaced by land slides Number of the poor displaced by earthquakes		Ministry of Disaster Preparedness and Refugees	

The last column of the table provides general data that relate to country-specific indicators. However, the data are general and not specific to the poor, although where the data are provided for rural areas they are close estimates as most rural people are poor. For many of the indicators, data are not available. Much more effort, beyond this review, is needed to identify and measure these indicators.

Table A3 PEAP Indicators

PEAP Goal	Targets	Monitoring indicators
3.1 Poverty outcomes	PEAP gives target for head count of 10% by 2017	Poverty head count Per capita consumption of poorest 20% Proportion of households suffering severe income shocks
3.3 Land	Implementation of structures in Land Act	Poor rural households with no access to land
3.5 Agriculture, livestock, forestry, fisheries, food security		Agricultural incomes Real food expenditures (for food security, also catches some gender aspects) Crop yields Proportion of farmers with access to advisory services Compliance with environmental standards
4.5 Water and sanitation	100% or maximum feasible access to safe water by 2015	Access to improved water source (<0.5 km) Forms of sanitation used by households (facility and practices) Sanitary facilities in schools and markets Quality of water sources
4.8 Housing 4.10 Disaster management	Proportion thatched	

Source: MFPED (2000).

A.6 Data Sources

One potential data source is the monitoring being undertaken for the PEAP, involving a number of agencies including the Poverty Monitoring and Analysis Unit (PMAU) in the Ministry of Finance, Planning and Economic Development, the Uganda Bureau of Statistics and the Uganda Participatory Poverty Assessment Project. Line ministries are also responsible for monitoring poverty indicators. The methods used include household surveys, participatory work and the development of indicators. It has also been proposed that a geographical information system should be developed to link existing data sources and to facilitate analysis of the spatial distribution of poverty (MFPED, 2000a). A number of indicators have already been developed, some of them of relevance to this study. Table A3 sets out these indicators.

Some of the monitoring indicators suggest that data are available (or will be collected) that are of relevance to the suggested indicators set out in Table A2. Table A4 shows the data collection methods available for monitoring poverty in Uganda. The potential for data to be collected through these methods for the indicators set out in Table A2 could be explored.

Table A4 Methods of Data Collection for Poverty Monitoring

Level	Method	Frequency	Output
Impact	Population census	10 years	Country Status Report
	Demographic Health Surveys	5 years	Poverty Impact Assessment Reports
	Impact Studies		
Outcomes	Household surveys	Bi-annually	Poverty Status Reports
	PPAs		
	Independent study reports		
Outcomes (intermediate)	National Service Delivery Surveys	Bi-annually	Beneficiary Assessment Report
	Management information systems	Annually	Service Delivery Report
	Sentinel sites		
Outputs	Management information systems		Quarterly/Annual Sectoral Reports
	Field visits	Quarterly	
Inputs	Administrative records		Quarterly/Annual Reports
	Tracking studies	Quarterly	

Source: PMAU (2000, p. 17).

A.7 Conclusions and Recommendations for Further Work

Not much work has been put into developing indicators relating poverty and the environment in Uganda. However, the demand for such indicators is very high. Poverty–environment indicators are needed to monitor the impact on the environment of the economic, social and cultural activities of the poor. They are also needed to monitor the impact of environmental conditions on the activities of the poor.

The recognised need for poverty–environment indicators has led to the formation of a working group composed of the PMAU, Uganda Bureau of Statistics, the National Environment Management Authority and the Economic Policy Research Centre to develop these indicators jointly. The purpose is to incorporate these indicators in the framework for monitoring the impact of economic policies on poverty and the environment. The PMAU has already identified indicators to monitor under the four pillars of the PEAP. Table A5 gives the details. As can be seen from the table, there are few environment-related indicators, and the working group is expected to identify such indicators. The Uganda Bureau of Statistics will be undertaking a data-collection exercise in April, and by then the working group should have completed its work so that the relevant data are collected. The Economic Policy Research Centre is involved in a DFID-funded joint research project with the Universities of Bradford and Manchester, UK on identification and measurement of indicators of success/failure and sustainability of farming systems. The results from this project will be useful in identifying indicators that can be measured and monitored at local level where poverty eradication programmes are being implemented.

Table A5 Poverty Monitoring Priority Indicators

Indicator	Frequency of reporting	Current status
Economic indicators		
Real private consumption	bi-annual	
Proportion of national budget used for poverty-focused programmes	annual	23%
Level of contract enforcement	bi-annual	
Saving/GDP ratio	annual	
Real sectoral growth rates:	annual	
Agriculture		3.2%
Manufacturing		8.6%
Construction		9%
Wholesale and retail trade		5.2%
Transport and communication		8%
Domestic revenue/total budget	annual	13%
Domestic revenue/GDP	annual	12%
Invest/GDP ratio	annual	
External debt/GDP ratio	annual	
NPV (debt)/total exports	annual	
Total debt service/total exports	annual	
Total debt service/government revenue	annual	
Good governance and security		
Number and proportion of high-level corruption cases brought to prosecution	annual	
Perceptions of the public on trends in corrupt tendencies	bi-annual	
Levels of awareness among the population on their rights/entitlement by sex and location	bi-annual	
Incidence of misappropriation of public funds	annual	
Number of people internally displaced/refugees	annual	
Number and proportion of households experiencing major shocks over the last year	bi-annual	
Number of Ugandan civilian casualties in conflict	annual	
Crime rates	annual	0.3%
Size of remand population	annual	10 400
Public perception of quality of service (police, judiciary)	bi-annual	
Number of levels of responding to amnesty and other local peace initiatives	annual	
Number of people abducted/captured by age, sex	annual	
Increasing income of the poor		
Poverty indicators – incidence/depth	bi-annual	44%
Number and proportion of population living under thatched houses	bi-annual	
Number and proportion of district's roads in poor condition	annual	
Crop production levels (major)	bi-annual	
Yield rates of major crops	bi-annual	
Adoption rates bi-annual Access to agricultural inputs by sex and location	bi-annual	
Rural/urban terms of trade by location	annual	
Contact rates with extension service by sex and location:	bi-annual	
Male		6.7%
Female		8%
Access to vocational/technical training by sex and location	annual	
Trends in landlessness by sex and location	bi-annual	
Accessibility to markets	bi-annual	
Number and proportion of population accessing microcredit by sex and location	bi-annual	
Gainful use of credit	annual	

Indicator	Frequency of reporting	Current status
Level of compliance to environmental standards annual		
Per capita consumption of poorest 20% by location	bi-annual	
Improving quality of life		
Life expectancy in years by sex	5 years	40
Infant mortality	5 years	97/1000
Maternal mortality	5 years	506/100 000
Nutrition (stunted)	5 years	38%
Health:		
Immunisation coverage	annual	51%
Proportion of health centres with minimum staffing norms	annual	

This report is an important contribution to the ongoing debate on identifying and measuring monitorable indicators. Whereas a good number of indicators have been identified, they are yet to be measured and tested at national, district and sub-county levels where monitoring exercises will be taking place. Implementation of poverty reduction programmes is taking place at local government level (sub-counties and districts), so for the indicators to be relevant, they should be easy to measure and monitor at these levels of local government.

As suggested earlier, much more work is needed to identify and measure poverty–environment indicators. This can be done through research conducted in collaboration with the PMAU and the Uganda Bureau of Statistics. The latter is responsible for collecting and compiling national household data, and is the best source of data to measure these indicators.

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ANNEXE B: POVERTY – ENVIRONMENT INDICATORS FOR NEPAL

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B.1 Characteristics of Poverty in Nepal

Nepal is one of the poorest countries in the world (per capita income $220). Half the population live on less than $1 per day. A fifth are very poor. The key characteristics of poverty are low calorific intake; low health and literacy standards, especially among women and girls; high indebtedness. and high out-migration. The poor have no effective voice in the political process and limited rights to resources.

In the rural areas those without land and with marginal landholdings and so-called untouchables are very poor and suffer social discrimination and exclusion. Social indicators are least favourable in the far west, and most favourable in urban areas.

The numbers in poverty have increased as population growth (2.5%) has exceeded the economy's capacity to generate additional income. The economy responded to liberalisation in 1991 (average growth 5.5% during 1991–94) but momentum has not been sustained (3.6% in 1996–97) and effects are confined to urban areas. The situation potentially has severe implications for Nepal's ability to maintain political and social cohesion in the face of increasing internal tensions.

The primary causes of poverty in Nepal include:

- natural resource and access constraints that limit opportunities for broad-based economic growth and access to critical services
- low levels of education and poor health which constrains people's ability to express needs and exploit new opportunities
- lack of accountability and competence within government
- prevalence of patronage (in which paternalism fosters dependency); this inhibits development of participatory institutions inside and outside government

(DFID, 2000).

B.2 Environment and Sustainability

The environment of Nepal is characterised by deforestation, over-use of limited available land for agricultural purposes, high population pressure in arable land, increasing congestion in urban centres which are further deteriorated by unplanned growth, and increasing problems of waste disposal and pollution. Environmental problems such as increasing

loss of topsoil, deforestation, water shortages, flash floods and degradation of large tracts of agriculture, forest and pasture lands have increased considerably over the years. Forest cover in Nepal declined from 37% in the late 1970s to 29% in the early 1990s. This trend is fuelled by land-clearing for agricultural purposes, increasing population pressure and commercial logging. Deforestation has affected poor people in two main ways: fuel-collection times have increased, and opportunities to generate income from forests have declined. The pollution situation has worsened, especially in fast-growing urban centres. Problems of water supply, sanitation and waste disposal are increasingly becoming endemic. These problems are exacerbated by loss of biodiversity, increasing use of toxic pesticides, unsustainable use of chemical fertilisers and depletion of natural resources, and these problems are further aggravated by rapid growth in population. Policies and strategies being pursued are directed towards quicker yields, rather than sustainability. Virtually all sectors of economic activity – agriculture, forestry, tourism, industry, etc. – are not developed on a sustainable basis, thus compounding the problems. This scenario has made it essential to adopt strategies to link population, development and environment in a sustainable manner.

B.3 Generic Indicators and Sources of Data

The adaptation of the generic indicators and values made particular use of the Nepal Living Standards Survey (NLSS), a household survey collecting information on housing and health. Data were also collected from the Central Bureau of Statistics, and government ministries including Land Reform, Agriculture, Water Resources and Housing and Physical Planning.

The country indicators have slightly adapted the generic indicators, but most of the generic indicators were found to be applicable to the understanding of poverty–environment linkages in Nepal. As an example, the generic indicator 'area of forests co-managed by user groups with representatives of the poor' was changed to 'percentage of forests managed by user groups with the representatives of the poor'.

B.4 Conclusions

The poverty–environment indicators for Nepal (Table B1) show that the poor appear to be increasingly marginalised, with increasing environmental deterioration and income gaps. Selective approaches and strategies will be required to address these issues, based on the indicators identified.

Table B1 Proposed Poverty and Environment Indicators (Nepal)

Generic indicator(s)	Country indicator(s)	Data sources	Value (level) of indicator
Proportion of the poor with secure use rights to land for farming Percentage of poor farmers with access to x hectares to grow food for household consumption Proportion of the poor living in ecologically fragile areas Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture (either subsistence agriculture or farm labouring?) Access to non-farm sources of livelihood for the poor living in ecologically fragile areas Percentage of poor farmers with access to sustainable irrigation facilities	Percentage of the poor living on marginal land such as ecologically fragile highland areas, riverside areas Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture Percentage of poor with own land Percentage of landless poor Average cultivated area of poor Percentage of irrigated area in total cultivated area of the poor Average area with tenancy rights of the poor	Ministry of Land Reform Ministry of Agriculture Ministry of Water Resources Central Bureau of Statistics	National-level figures are non-existent Over 98% 82% of the poor own land 18% of the poor are landless 1 ºha per household 11% year-round and 24% seasonally 28%
Hours spent per day collecting water by women and children living in rural areas (noting seasonal variations) Access to sanitation facilities by women	Percentage of the poor with access to safe drinking water Amount of time spent by the poor collecting water Distance travelled by the poor to collect water Access to sanitation	Ministry of Housing and Physical Planning Central Bureau of Statistics	Percentage of total population with access to safe water: 71% (2000) Percentage of population with sanitation facilities: 22% Distance travelled for water collection: <30ºmin to 3ºh
Area of forests co-managed by user groups with representatives of the poor Hours spent per day/week collecting fuelwood by women and children in rural areas Percentage of common property land available to women for collecting fuelwood and non-timber products	Percentage of the poor using firewood, straw, thatch, cow dung, leaves, etc. Time spent collecting firewood by the poor Percentage of poor women with access to common property land for collecting fuelwood and other non-timber products Percentage of forests managed by user groups with the representative of the poor	Ministry of Forest and Soil Conservation Ministry of Land Reform Central Bureau of Statistics	99% of the poor <30ºmin to 2ºh Over 80% of women have access to common property About 15% of total national forests have been handed over to forest user groups in the hill and mountain regions

Table B1 Proposed Poverty and Environment Indicators (Nepal)

Generic indicator(s)	Country indicator(s)	Data sources	Value (level) of indicator
Percentage of poor fisherfolk with access to adequate fish catches			
Proportion of health burden of the poor related to environmental factors Disease incidence related to environmental factors disaggregated by age (e.g. vulnerability of children under 5)	Immunisation coverage Infant mortality rate Child mortality rate Maternal mortality rate Use of health facilities Time taken to travel to nearest health facility by the poor Access to health facilities or trained birth attendant during childbirth	Ministry of Health Central Bureau of Statistics	67% for measles to over 90% for tuberculosis Infant mortality rate: 73 in 2000 Child mortality rate: 118 Maternal mortality rate: 480 in 2000 Time taken to reach health facilities <30ºmin to 3ºh Access to professional assistance during child birth for poor: 45%
Percentage of people living in substandard housing (rural and urban figures)	Percentage of poor with substandard housing Average house space per household	Central Bureau of Statistics Ministry of Housing and Physical Planning	96% of total houses are substandard Per household space availability: 384 ft^2 for poor
Percentage of population living in areas prone to flooding Number of poor people killed by environmentally related disasters Number of poor people made homeless by environmentally related disasters	Percentage of poor people living in flood-prone areas Number of the poor displaced by landslides Number of the poor displaced by fire Number of deaths due to environmental disasters	Ministry of Home Ministry of Agriculture Ministry of Land Reform	National-level rate not available 17º842 families affected in 1999/2000 1489 people died from natural disasters in 1999/2000

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ANNEXE C: POVERTY–ENVIRONMENT INDICATORS FOR NICARAGUA

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C.1 Background

The fundamental causes of poverty go back to the economic patterns of the 1950s–1970s, as well as to the economic collapse of the 1980s (caused by the intention to create a planned economy, politicians' fiscal and monetary inconsistencies, and the devastating effects of civil war). The result was unprecedented hyperinflation; a drastic reduction in exports, production, revenues and national wealth; and (from 1985–90) virtual economic collapse. In 1990, individuals had the same per capita income as in the 1950s. The physical infrastructure was practically destroyed, and the social network had been ruptured. Nicaragua began the slow and painful process of reconstruction.

After economic stagnation between 1990 and 1993, in 1994 real growth of the GDP was renewed, and from that time growth has accelerated despite hurricanes, earthquakes and droughts. Nevertheless, the economy is at levels below those at the end of the 1970s, and Nicaragua continues to be the second poorest country in the southern hemisphere.

In 1993 a little over half the population fell below the poverty line, and even after economic recovery began, in 1998 almost 48% of the population remained in poverty, and 17.3% in extreme poverty (having calorie consumption below the minimum needed to maintain a healthy life). Almost 70% of rural residents are poor; 29% are extremely poor. Urban poverty is also widespread, especially outside the capital city of Managua, which is recovering quickly – more than 30% of urban residents are poor, although fewer than 8% are extremely poor. But Nicaragua shows signs that growth on a wide base is reducing poverty. Between 1993 and 1998, detailed surveys showed that rural poverty decreased significantly thanks to strong agricultural recovery. Levels of poverty in Managua also diminished with the expansion of private services. Nevertheless, in some areas – particularly the Atlantic Coast and in the smallest cities – levels of poverty became worse. In the present decade, poverty reduction remains the main challenge facing Nicaragua.

There is also a strong social dimension to poverty in Nicaragua, caused by the limited education, health and

other services that the government offers to the poor. Almost 30% of the poor are illiterate, and they have an average of little more than 3 years of school, more than 50% below the national average. The figures are worse for the extremely poor – they average little more than 2 years of school. In both cases, this is less than the time necessary to obtain basic literacy, let alone the skills required for a modern economy. Extremely poor children get sick much more frequently than the better-off, and they have less access to medical services. More than 30% of poor children and 40% of extremely poor children are undernourished.

C.2 Environmental Vulnerability

Environment

Nicaragua has advanced significantly in understanding its environmental problems, and in the future it should approach them more efficiently. The frequent occurrence of natural phenomena, and inadequate handling of natural resources, have increased the ecological risk factors and led to more environmental deterioration and vulnerability. Hurricane Mitch exposed the national inability to deal with major disasters and the extreme burden placed on the population, especially the poor.

Despite the reduction of natural forest and ecological deterioration arising from human invasion and natural phenomena, Nicaragua still has substantial natural resources and the potential to improve livelihoods and attack poverty. Measures are needed to reduce ecological vulnerability. Such measures will need institutional changes, and specific projects and programmes to protect natural resources and the environment.

The means of reducing ecological vulnerability will be integrated into the Environmental Plan of Nicaragua (PANIC) 2000–05 which is being prepared by the Ministry of the Environment and Natural Resources. Following government approval, this plan will become the environmental policy of Nicaragua. In addition to evaluating and modernising environmental policy, the Plan also contemplates coordinating the efforts of government institutions and civil society toward the rehabilitation of hydrographic basins and polluted areas; reforestation; and the establishment of practical ways to manage erosion and the expansion of the agricultural frontier. A national system of environmental information will be developed. Laws are being prepared to improve the use of water resources, to modernise mining, forestry and fishing, and to conserve biodiversity. In a few years the nation will have a modern legal basis for regulating many of its environmental problems.

Better handling and use of water reserves, and their administration, will be necessary to ensure sustainable development. The government has prioritised the rehabilitation of the more vulnerable hydrographic basins, and has prepared a programme for better handling of these. They are also taking corrective measures for the rehabilitation of river basins, encouragement of reforestation, the conservation of the area, and the diversification of cultivation by small farmers. Better legislation is being prepared for the administration of local environmental and natural resources; starting from this point, municipal environmental activities will be encouraged.

Despite these measures, major disasters at the national level cannot be ruled out. The government will prepare

a geographic information system to locate natural threats, as well as early alert systems and geological maps, and will improve surveillance of volcanoes and areas that present danger of collapses or landslide. These activities, combined with education and better space planning, may reduce practices in the fragile rural areas that have increased the environmental risk to the nation.

Vulnerability and marginality

The poor run several risks and have many areas of vulnerability. This section reviews the most common.

HIGH VULNERABILITY TO NATURAL DISASTERS

Nicaragua is affected by diverse natural calamities. Volcanic eruptions, hurricanes, earthquakes and floods are frequent, and they cause ecological deterioration and great destruction of property and infrastructure. Recent catastrophes (El Niño, Hurricane Mitch, La Niña, earthquakes in Managua and Masaya) have demonstrated that the poor are much more likely to be adversely affected by these natural disasters than the non-poor. Poor housing is especially vulnerable due to inadequate construction; and when affected the poor do not have enough savings to cover emergencies. The public sector rarely compensates them for losses, and they are forced to reduce already inadequate levels of consumption even further. The loss of employment caused by some disasters causes people to emigrate in search of employment, or to move into illegal activities such as prostitution, drug trafficking or delinquency.

WEAKNESS OF PROPERTY RIGHTS

The uncertainty that surrounds property rights is one of the main factors inhibiting the development of a market in land and other productive assets, as well as investment in the rural economy and its diversification. The confiscation of land in the 1980s, and the commitment of land distribution to the ex-combatants in the 1990s, are factors that hinder rights to property in the field. Also, the absence of registration and a modern legal system for landowning makes it impossible to ensure that the law is enforced. The uncertain holding of land offers few incentives for private investment, and also restricts access to institutional credit because land cannot be used as collateral without documentation.

INFRASTRUCTURE PROBLEMS

The lack of investment and insufficient maintenance of the physical infrastructure during the 1980s; deterioration due to the war; and the effects of natural disasters have made the Nicaraguan infrastructure one of the faultiest in Latin America. Substantial amounts of private capital are needed to rehabilitate the infrastructure for electricity generation and telecommunications, ports and roads. These deficiencies are translated into higher administrative costs of production and of commercialization. Privatisation of the public service companies is in progress; but it is most likely that expansion and prospective improvements will happen only in the medium term.

VULNERABILITY AND IMPACTS

Nicaragua has historically been vulnerable to natural disasters (hurricanes, floods) which have caused substantial damage to the environment, and have seriously affected agricultural production. Earthquakes have caused destruction of housing, infrastructure and factory facilities. Also, the Nicaraguan economy has been affected by other external factors, such as wide

and frequent variations in exchange terms, particularly the falling price of its main export products including coffee and cotton, and increases in the price of petroleum. This has affected investment levels and has seriously disturbed production and the stability of the macro-economic administration, making economic diversity necessary. In addition, the advance of the agricultural frontier toward the east has intensified the ecological damage and increased vulnerability.

C.3 Generic Indicators: Strengths and Weakness

To evaluate the strengths and the weaknesses of the list of generic indicators, it is necessary to analyse it in two dimensions. The first is from the perspective of existing sources of primary data, the methodology for data gathering, technology of data analysis, and popularisation of the results which should be published for effective use. From this perspective, the existing database in the country allows partial coverage of the generic indicators in the survey of 1998 (published 2000). The annual report of the National Institute of Statistics and Censuses (INEC) also gives partial coverage. But this situation is temporary – starting from 2001, a national system has been implemented to inform the Poverty Reduction Strategy to Fight Poverty, with the support of the World Bank and other international organisations. This will include a detailed information system on aspects related to poverty and the environment that will include the generic indicators presented in this report.

The second dimension to the list of generic indicators is whether, individually or together, they capture the relationship between poverty and ecological vulnerability. In our opinion there are some indicators of poverty that are already being gathered which will help to improve the understanding of this problem. Three of these indicators have been incorporated here. Other potential indicators include the time dedicated to community work and to recreation, severe poverty in ecologically fragile areas, infant mortality in ecologically fragile areas, and percentage of forest area per capita destroyed annually, among others (Table C1).

C.4 Potential Data Sources: Reliability, Frequency and Relevance

The objective of INEC is to collect and publish all the national statistics. This institution has three fundamental instruments: the National Census (every 10 years); the National Survey of Homes (every 2 years); and specific studies. Every year a statistical annual report is published that picks up social and economic information for each of the sectors of the country.

The data given in this report are all contained in the National Survey of Homes measuring livelihoods for the year 1998. The methodology and samples are reliable and pertinent, and are used by different multilateral organisations such as the World Bank.

With the implementation of the Poverty Reduction Strategy, several indicators of poverty and environment have been incorporated by INEC. In the next survey they will incorporate others, including most of the generic indicators analysed in this report, providing a secure source of information for the future.

Table C1 Proposed Poverty and Environment Indicators (Nicaragua)

Generic indicator(s)	Country indicator(s)	Rationale for country indicator(s)	Data source	Value (level) of indicator
Proportion of the poor with secure use rights to land for farming	Access to non-farm sources of livelihoods for the poor living in ecologically fragile areas Percentage of the poor living on marginal land such as fragile highland areas	Secure use rights	National Institute of Statistics and Census in all instances	National-level figures are non-existent
Percentage of poor farmers with access to x hectares to grow food for household consumption	Percentage of the poor living on marginal land such wetlands	Sufficient hectares for subsistent production of food for household consumption		National-level figures are non-existent
Proportion of the poor living in ecologically fragile areas	Percentage of the poor living on agriculturally unproductive land	Who are the people living in ecologically fragile areas?		National-level figures are non-existent
Proportion of the poor living in ecologically fragile areas whose main source of livelihood is agriculture (either subsistence agriculture or farm labouring?)	Percentage of the poor living on agriculturally unproductive land	Who are the people living in ecologically fragile areas?		National-level figures are non-existent
	Percentage of the poor living on non-farm sources in ecologically fragile areas	To know who are the people living in ecologically fragile areas		National-level figures are non-existent
Percentage of poor farmers with access to sustainable irrigation facilities	Percentage of the poor with access to safe drinking water	To know the number of poor farmers who have access to sustainable irrigation facilities		National-level figures are non-existent
Hours spent per day collecting water by women and children living in rural areas (noting seasonal variations)	Percentage of the poor with adequate water for livestock	Number of people with access to adequate water for livestock		Percentage of rural population with access to safe water: 29.9% (1998); 82.5% carried water and dedicated an average of 1.2 h; of these, 71% were male (1998)
Access to sanitation facilities by women	Amount of time spent by the poor collecting water	Access to sanitation facilities		National-level figures are non-existent
	Distance travelled by the poor to collect water			Percentage of rural population with access to sanitation: 30% (1998); 39% (1999); 54% (target 2003)
	Percentage of poor people with access to sanitation facilities			

Generic indicator(s)	Country indicator(s)	Rationale for country indicator(s)	Data source	Value (level) of indicator
Area of forests co-managed by user groups with representatives of the poor Hours spent per day/week collecting fuelwood by women and children in rural areas Percentage of common property land available to women for collecting fuelwood and non-timber products	Percentage of the poor working in areas of forest co-managed Percentage of the poor using firewood and charcoal as major source of energy Time spent collecting firewood by the poor Percentage of poor women with access to common property land for collecting fuelwood and other non-timber products	Management regimes for forests People and their time dedicated to collecting fuelwood in rural areas Access to common property available for collecting fuelwood and non-timber products		National-level figures are non-existent Percentage of rural population collecting fuelwood: 91% (1998); 82.5% carried water and dedicated an average of 1.7 h; of these 71% were women (1998)
Percentage of poor fisherfolk with access to adequate fish catches	Amount of fish catch per day per fisherman	Access to adequate fish catches		National-level figures are non-existent
Proportion of the health burden of the poor related to environmental factors – disease incidence related to environmental factors disaggregated by age (e.g. vulnerability of children under 5)	Incidence of malaria among the poor Incidence of cholera among the poor Incidence of typhoid fever among the poor	Factors and type of illness identified among poor people		

Generic indicator(s)	Country indicator(s)	Rationale for country indicator(s)	Data source	Value (level) of indicator
Percentage of people living in substandard housing (rural and urban figures)	Percentage of poor people living in substandard housing (rural and urban areas)	Who are the poor living in substandard housing?		Percentage of housing distribution: 56.7% (1998) urban; 43.3% rural
Percentage of the population living in areas prone to flooding Number of poor people killed by environmentally-related disasters Number of poor people made homeless by environmentally-related disasters	Percentage of poor people living in flood-prone areas Number of the poor displaced by landslides Number of the poor displaced by earthquakes Percentage of people made homeless by environmentally related disasters	Vulnerable population living in ecologically fragile areas Who are the population living in fragile ecologically and disaster areas? Who are population living in high-risk earthquake areas? People who lost their homes due to environmentally related disasters		National-level figures are non-existent National-level figures are non-existent National-level figures are non-existent Percentage of people who had taken care of sick: 3.1% (1998); they dedicated an average 2.3 h; the majority (74%) females
Other related indicators Hours spent per day to take care of sick Hours spent to look for health attention Type of hygienic service	Percentage of people and number of hours spent in taking care of the sick Percentage of population and number of hours spent in looking for health attention Percentage of people by type of hygienic service	Time dedicated to caring for the sick Time dedicated to looking for health attention To know the number of people with access to different types of hygienic service		Percentage of people who had looked for health attention: 2.2% (1998); 3 h (urban); 5–8 h (rural); 64.4% were female 83% possess some type of hygienic service: 61.2% latrine; 22.5% toilet

The next annual reports of INEC will be supplemented with census data and particular data related to sensitive sectors, such as warning and prevention of disasters (the National Emergency Committee and the Center of Territorial Studies), as well as the agricultural census that is carried out at the moment.

Nicaragua has excellent data related to the environment, poverty, and economic and social topics, concentrated in a single institution and supported by international organisations, government ministries and other organisations.