

# WORLDWIDE

HUMAN WELL-BEING, POVERTY & ECOSYSTEM SERVICES

## Exploring the Links

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**iisd** International Institute for Sustainable Development / Institut international du développement durable

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United Nations Environment Programme

**iisd** International Institute for Sustainable Development / Institut international du développement durable

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## United Nations Environment Programme

The mission of the United Nations Environment Programme (UNEP) is to provide leadership and to encourage partnerships in caring for the environment by inspiring, informing and enabling nations and peoples to improve their quality of life without compromising that of future generations.

### Division of Policy Development and Law (DPDL)

The objective of DPDL, a division within UNEP, is to enable members of the international community to develop integrated and coherent policy responses to environmental problems and to strengthen environmental law as well as to improve compliance with and enforcement of legal instruments.

### Policy Branch

Within DPDL, the Policy Branch is responsible for coordination of policy review, analysis and development as well as for the promotion of regional and national environmental policy development. It fosters partnerships with UN agencies, donors, the private sector and civil society to promote policy development in areas such as water, land-use, drylands, urban environment, poverty and environment linkages, health and environment, climate change and energy.

Work on linkages between poverty and environment, activities of the Policy Branch are driven by UNEP's mandate on this issue as well as on the Millennium Development Goals, the Johannesburg Plan of Implementation adopted at the World Summit on Sustainable Development and UNEP's recently adopted theme of "Environment for Development." An important aim is to ensure that key environmental issues are effectively captured within socio-economic and accounting frameworks as well as through indicators. Another is to make sure that distributive and equity issues are properly addressed when undertaking economic interventions. The main areas of concentration of the Policy Branch on poverty and environment are the following:

- Building national capacity to carry out Multi-Scale Integrated Assessments exploring links between human well-being, poverty and ecosystem services using the Capability-Ecosystem Approach.
- Building country capacity to develop instruments, both economic/market-based and non-market instruments that address efficiency, equity and distributive concerns.
- Building the capacity of countries to integrate ecological/environmental policies within Poverty Reduction Strategies and National Development Strategies at all appropriate levels.
- Building the capacity of national governments to develop ecosystem-dependent socio-economic indicators that can be used by policy-makers when making decisions.

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However, an output like this would not be possible if not for the contributions of many individuals. We express our gratitude to the many participants and organizations that have made this publication possible through their commitment and cooperation. The financial and intellectual contributions of the Norwegian Ministry of Foreign Affairs—with special thanks to Anne Marie Skjold—have made this publication and the UNEP poverty-ecosystem program possible. The author acknowledges Flavio Comim, Kirk Hamilton, Philip Dolbie, Margaret Kakande, Peter Schei, Ivar Baste, Naresh Singh and Pumulo Muyatwa for their critical comments and suggestions on earlier versions of this publication.

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IFAD / H. Wagner

## Executive Summary

**IN** February 2001, the twenty-first Governing Council of the Global Ministerial Environment Forum in Nairobi, Kenya, passed resolution 21/15. Governing Council Resolution 21/15 asks the Executive Director of the United Nations Environment Programme to develop and promote understanding of (1) the linkages between poverty and the environment; (2) means of making people's livelihoods more productive and environmentally sustainable; and (3) appropriate policy options for governments. A significant priority should be to assist governments in integrating environment in central social and economic processes, including the poverty reduction strategies and the comprehensive development frameworks.

This publication is UNEP's response to the request. It presents the conceptual framework on poverty and ecosystems. The paper sets out to achieve three objectives. The first objective is to demonstrate how human well-being is dependent on ecosystems and ecosystem services. The second objective is to identify barriers and drivers that prevent the poor from using these ecosystem services to improve their well-being, thereby perpetuating poverty. And the third objective is to identify policy response options to remove the barriers, re-design or even introduce new intervention strategies to allow the poor to improve their well-being through an ecosystem approach.

### CONSTITUENTS OF WELL-BEING AND ECOSYSTEM SERVICES

**WE** move away from the one-dimensional perspective of poverty as income or opulence deprivation to a multi-dimensional approach that encompasses a multitude of constituents and determinants of well-being. The deprivation of these constituents and determinants is defined as poverty. The constituents and determinants of well-being we use in this paper go beyond the provisioning of goods to achieve a particular constituent, to the broader concept of the capability to achieve any specific constituent or determinant of well-being. In other words, the emphasis is on empowering individuals—especially the poor—to become agents of change rather than victims requiring aid.

Ten constituents and determinants are identified as essential for improving well-being and reducing poverty. These are:

- 1] **Being able to be adequately nourished.**
- 2] **Being able to be free from avoidable disease.**
- 3] **Being able to live in an environmentally clean and safe shelter.**
- 4] **Being able to have adequate and clean drinking water.**
- 5] **Being able to have clean air.**
- 6] **Being able to have energy to keep warm and to cook.**
- 7] **Being able to use traditional medicine.**
- 8] **Being able to continue using natural elements found in ecosystems for traditional cultural and spiritual practices.**
- 9] **Being able to cope with extreme natural events including floods, tropical storms and landslides.**
- 10] **Being able to make sustainable management decisions that respect natural resources and enable the achievement of a sustainable income stream.**



### Exploring the Links

In this paper, we adopt the definition of ecosystems and ecosystem services developed and used by the Millennium Ecosystem Assessment (MA). In the MA's definition, ecosystems provide three broad services:

- 1] **provisioning (food, fiber, fuels);**
- 2] **regulating (purification, detoxification, mitigation of droughts and floods); and**
- 3] **enriching (spiritual, aesthetic, social).**

## Executive Summary

**THE** relationships among many of the constituents and determinants of well-being are very closely linked with the three services provided by ecosystems. However, the magnitude of the relationship differs across stakeholders. For example, the “non-poor” can buy clean water or the equipment to filter and purify water if it is contaminated. The poor, on the other hand, have limited resources to pursue these options and usually have no option but to depend on natural and/or public water supply systems. In 1995, 3.1 million people—80 per cent of them children—died from diarrhea. Many of these deaths were caused by contaminated water.

The Millennium Development Goals (MDGs) have now become an integral part of many international and national initiatives to reduce poverty. Not surprisingly, achieving many of the constituents and determinants of well-being linked with ecosystem services will directly or indirectly contribute to the attainment of a number of the MDGs. The conceptual framework presented in this publication sets forth an approach that countries can use in achieving the MDGs in a sustainable manner.

### BARRIERS AND DRIVERS

**THE** destruction of mangroves for commercial shrimp farming removes a natural barrier against storms which inadvertently increases the vulnerability of many poor coastal communities. A lack of well-defined property rights was cited as one of the principal causes for the conversion of these mangrove forests. Another major driver for land degradation is the fact that, due to social barriers, women have had limited authority in making decisions related to ecosystem use. The exclusion of women—the primary users and custodians of the land—has inevitably transferred land use decisions to stakeholders who have very little knowledge or interest in the sustainable use of land.

Corrupt government officials, combined with complex and time-consuming administrative procedures, make access to ecosystem services a costly and humiliating experience for the poor. The poor are often made to feel inadequate and “stupid” by government officials when they find it difficult to understand and fill out forms. This in turn increases the need to use “middle men” to access the public sector in order to secure economic facilities to earn an income from ecosystem services. The whole process becomes costly and inadvertently forces the poor to degrade the ecosystems by pursuing short-term, high-profit activities.

The various barriers and drivers we identified that play a significant role in poverty-ecosystem relationships could be classified into four major categories: (1) economic; (2) social; (3) governance-related; (4) and ecological.



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## RESPONSE OPTIONS

**I**n order to correct or remove the drivers, we need to approach the problem in an integrated fashion. We believe that there are two components in a successful policy intervention strategy. The first component looks at the tools of intervention; the second component focuses on the enabling conditions needed for the successful development and implementation of the tools.

We classify instruments (market and non-market); institutions (formal and informal); and organizations (public, private and civil) as tools. The difference between the approaches taken here compared to other existing policy frameworks is the integration of instruments, institutions and organizations within a single frame of reference. Policy options have, in a majority of cases, been approached in a partial manner.

The second critical component is the use of an overarching framework to provide the enabling conditions for the successful development and implementation of the tools to remove barriers. In this paper, we develop a framework embracing the concept of freedoms. As mentioned early in this paper, we want to focus on increasing the capabilities of the poor to achieve the constituents and determinants of well-being. The capabilities of the poor are determined by the enabling conditions represented by six instrumental freedoms.

### BOX 1

**In India, poor and low scheduled caste women were perceived to be at the forefront of social justice movements. It was argued that particularly in rural areas environmental issues provide an entry point for the poor to contest their rights and entitlements. Issues contested include access to land and common property resources, equitable distribution of water sources and irrigation channels.**

Source: Voices of the poor: Poverty in People's Perceptions 1999:9, V. Gayathri

The six instrumental freedoms that we believe will address the four broad categories of drivers highlighted earlier are:

- 1] **economic facilities;**
- 2] **social opportunities;**
- 3] **transparency guarantees;**
- 4] **ecological security;**
- 5] **protective security; and**
- 6] **participative freedom (which can be considered an intrinsic freedom essential for the other instrumental freedoms to be designed and formulated by the poor for the poor).**

## CONCLUSION

**T**HIS publication's main contribution to the poverty-ecosystem debate is the adoption of an ecosystem approach and the equal treatment given to all three services that ecosystems provide. The publication also extends the policy response strategy by advocating the use of an integrated framework of instruments, institutions and organizations to address the provision of instrumental freedoms as the principal way to provide the poor with the capability to achieve the constituents of well-being related to ecosystem services. The paper ends by outlining a process through which the conceptual framework can be operationalized.



## Exploring the Links



## Introduction

**I**n February 2001, the twenty-first Governing Council of the Global Ministerial Environment Forum held in Nairobi, Kenya, passed resolution 21/15 (see Box 2).

This resolution comes on the heels of two previous declarations. The Malmö Ministerial Declaration was adopted by UNEP's Global Ministerial Environmental Forum in May 2000. The declaration noted that the World Summit on Sustainable Development (WSSD) in 2002 should address the two major challenges to sustainable development:

- 1] The pervasive effects of the burden of poverty on at least half of humanity; and**
- 2] The excessive and wasteful consumption and inefficient resource use that perpetuates the vicious cycle of environmental degradation and increasing poverty.**

In September 2000, 146 heads of state pledged in the United Nations Millennium Declaration to spare no effort to free all of humanity—especially future generations—from the threat of living on a planet irredeemably spoiled by human activities and whose resources would no longer be sufficient to meet their needs.

These international declarations come at a very appropriate time as it becomes increasingly clear that current patterns of economic development have led to:

- degradation of ecosystems; and
- very uneven wealth creation, with increased disparities within and between countries.

Barring major philosophical and policy shifts, it is a situation that is likely to get worse and it will be particularly difficult for poor countries facing convergent economic and environmental crises. More needs to be done and UNEP can play a pivotal role in meeting this challenge.



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**GOVERNING** Council Decision 21/15 has given a clear mandate to UNEP to provide assistance to governments—especially in less-developed and highly-indebted countries—on ways and means to incorporate environmental considerations within their national poverty reduction strategies. This role will become increasingly important as the momentum for the development of the Poverty Reduction Strategy Papers (PRSPs) increases and becomes accepted as the prerequisite for international aid.

Given the complex and multi-dimensional nature of poverty-environment linkages, the challenge for this publication is to present a framework that will meet the following three criteria if it is to be used by governments to reduce poverty through the sustainable management of ecosystems:

1. **SPECIFICITY** – The poverty-ecosystem linkages must capture the local conditions. Local conditions relate to the specific ecosystems and their services to the local communities, the economic activities, the social and cultural values, and, finally, the political and governance structures.
2. **CLARITY** – The poverty-ecosystem linkages must be discussed in a clear and concise manner even if the linkages are complex and multi-dimensional. The bottom line is that we must be able to draw inferences that allow policy-makers to formulate intervention strategies. For example, we must identify and understand the driving forces causing ecosystem degradation before we can formulate intervention strategies.
3. **PRACTICALITY** – The framework must be practical so that policy-makers can easily integrate policy strategies into existing decision-making frameworks.

In Section 2, we explore how some essential constituents of well-being relate to ecosystem services. The section aims to shed some light on the various links that may exist between human well-being—or, more appropriately, the deprivation of well-being (i.e., poverty)—and ecosystem services, and some of the driving forces dictating the links.

In Section 3, a policy intervention framework drawing on key principles developed by Nobel Laureate Amartya Sen is presented as an appropriate frame of reference to reduce poverty through an ecosystem approach.

Section 4 provides a systematic process for operationalizing the conceptual framework provided in the previous two sections. The process lays out a systematic route whereby policy-makers can integrate ecological variables into their poverty reduction strategies.

Section 5 ends the paper with an overview of the key points presented and the challenges governments will face in this complex endeavour.



## Exploring the Links

### BOX 2

Governing Council Resolution 21/15 requests the Executive Director of UNEP to develop and promote understanding of the linkages between poverty and the environment, means of making people's livelihoods more productive and environmentally sustainable, and appropriate policy options for Governments, a significant priority which should be to assist Governments in integrating environment in central social and economic processes, including the poverty reduction strategies and the comprehensive development frameworks.

GC.21/15

## Poverty-Ecosystem Linkages

### THIS SECTION SETS OUT TO:

1. identify essential constituents and determinants of human well-being closely linked with ecosystem services;
2. provide a taxonomy of the various services offered by ecosystems; and
3. describe the links among the various constituents and determinants of well-being and the various services ecosystems offer.

#### CONSTITUENTS AND DETERMINANTS OF HUMAN WELL-BEING RELATED TO ECOSYSTEMS

**WE** can argue that all people—rich and poor; living in developing or developed countries—depend on ecosystem services for their well-being. This is however only true in the long run. In the short run, the poor are more heavily-dependent on these services than the rich. For example, the rich can buy clean water or the technology to filter and purify water if it is contaminated. The poor, on the other hand, have limited resources to pursue these options and usually have no choice but to depend on natural water systems and/or public water supply systems, many of which do not meet the minimum standards for human consumption, especially in developing countries.

Another example is the smog crisis in many urban centres. The rich are able to isolate themselves from the smog by buying air conditioners, air cleaners, special surgical masks, etc. Poor people—especially the young—are less able to escape exposure to the full impact of the smog with disastrous effects on their health.



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**THE** same can also be said for extreme natural events like floods and tropical storms. These tend to have a bigger impact on the poor because they do not have the resources to build appropriate shelters or because their homes are built on land where the natural barriers to landslides and floods have been destroyed.

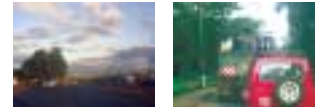
It has also been documented that poor women and children suffer disproportionately in acquiring dwindling natural energy supplies for cooking and heating. The suffering is amplified by the greater amount of time they spend in badly ventilated shelters when using highly polluting fuels like coal and firewood.

These examples point to a close relationship between the poor and ecosystems and demonstrate quite clearly the higher dependency poor people have on ecosystems for achieving well-being.

An extensive survey of the literature on the various linkages between poverty and ecosystems revealed the following 10 constituents and/or determinants of well-being closely related with ecosystems (Duraiappah 2002). But a word of caution—the final selection of well-being constituents and their relevance

*vis-à-vis* ecosystem services must be determined by the communities or individuals concerned, ideally through a participatory process:

- 1] **Being able to be adequately nourished.**
- 2] **Being able to be free from avoidable disease.**
- 3] **Being able to live in an environmentally clean and safe shelter.**
- 4] **Being able to have adequate and clean drinking water.**
- 5] **Being able to have clean air.**
- 6] **Being able to have energy to keep warm and to cook.**
- 7] **Being able to use traditional medicine.**
- 8] **Being able to continue using natural elements found in ecosystems for traditional cultural and spiritual practices.**
- 9] **Being able to cope with extreme natural events including floods, tropical storms and landslides.**
- 10] **Being able to make sustainable management decisions that respect natural resources and enable the achievement of a sustainable income stream.**



**Note:** There are many other constituents and determinants of well-being that we have not listed above—including education. We exclude these in this study as we focus only on the constituents and determinants of well-being directly related to ecosystems and their services.

There is a large degree of complementarity among the 10 constituents of well-being. For example, being able to get clean water will also contribute considerably towards improving the capability of the poor from contracting diseases. In the same vein, some of the prerequisites for being able to live in a safe and clean shelter are access to clean air and water. The high degree of complementarity suggests that addressing one constituent or determinant will provide considerable synergies towards achieving some of the other constituents and/or determinants of well-being.

In identifying the 10 constituents and determinants of well-being, we have also tried to move away from a one-dimensional approach that focuses solely on commodity, income and opulence to a broader multi-dimensional approach to well-being.

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**Exploring the Links**

## Poverty-Ecosystem Linkages

**THERE** is widespread agreement that well-being and poverty are the two extremes of a multi-dimensional continuum. The *World Development Report 2000/01* defined poverty as “the pronounced deprivation of well-being” (World Bank 2001). In this publication, we will define poverty linked to ecosystems as the deprivation of the 10 constituents and determinants of well-being identified above.

The 10 constituents can also be seen as a more detailed description of the World Bank’s broad classification of health, vulnerability and livelihoods that it uses in its framework to address the poverty–environment nexus (World Bank 2002).

However, in order to not get trapped in the traditional mistake of confusing means and ends (Sen 1993), we have modified the traditional notion of constituents and determinants of well-being to reflect the more dynamic concept of capabilities (see Box 3).

The 10 constituents and determinants used in this paper are similar to the concept of functionings and capabilities that Amartya Sen argues are essential to evaluate human well-being. We have added “being able to” before each constituent and determinant of well-being to allow us to incorporate the fundamental properties of capabilities—agency, value and choice.

### BOX 3

The market values commodities, and our success in the material world is often judged by our opulence; but despite that, commodities are no more than means to other ends. Ultimately, the focus has to be on what life we lead and what we can do or cannot do, can or cannot be. I call the various living conditions we can or cannot achieve our “functionings,” and our ability to achieve them, our “capabilities.”

Amartya Sen, 1987, pg. 16

For example, this will prevent us from focusing primarily on health facilities *per se*, but rather on the capability of people to avoid preventable diseases. By expanding the focus to capabilities, we are also able to broaden the information space to evaluate and measure the effectiveness of policy responses to improve well-being and reduce poverty. The information space needed to evaluate well-being or successes in poverty reduction under the capability approach will include not only income, but also the degree of choices, the level of autonomy and values.

It is for this reason that we deliberately begin each of the 10 constituents and determinants with the words “**BEING ABLE TO**”—the capability or freedom to achieve the functionings (also called constituents and determinants) that individuals value. In this way we introduce the concept of putting the poor at the centre and hand them control over how they achieve their well-being—they become active participants of the development process and not “victims” who need aid. This concept resonates well with the concept of sustainable development which focuses on long-term rather than short-term measures.

### ECOSYSTEMS AND ECOSYSTEM SERVICES

**IN** the literature on poverty and environment, “environment” is used to cover a range of issues related to the natural environment. However, the term environment by itself is ambiguous. The Oxford Dictionary defines environment as surroundings or conditions for life or growth. Used in this manner, the term confuses rather than clarifies a problem governed by complexity.

We are primarily interested in addressing how human well-being is influenced by the natural environment. Our purpose is therefore better served by explicitly defining the natural environment as the ecosystem. Moreover, humans are part of an ecosystem. By actually addressing human well-being from an ecosystem approach, we provide an integrated framework, which is a necessity if we are to understand the links between natural systems and human well-being.

**WE** therefore adopt the term “ecosystem” specifically to avoid the ambiguity the term environment brings to the discussion. There are many different ways of defining ecosystems and the services and goods they provide for human well-being. Here we draw on the ongoing work done by ecologists like Gretchen Daily (see Box 4), Hal Monney and, more recently, the Millennium Ecosystem Assessment to guide us.

Ecosystems are defined as: “A spatially explicit unit of the earth that includes all of the organisms, along with all components of the abiotic environment within its boundaries.”

It is becoming increasingly clear that ecosystems provide more than just goods for humans (see Box 4). They also provide critical life-supporting services. Ecosystems also provide cultural and spiritual values for human societies. Daily (1997) categorizes the various “services” ecosystems provide into the following three components:

- 1] provisioning;
- 2] regulating; and
- 3] enriching/cultural.

**PROVISIONING** covers natural resources that are primarily used for economic activities. The level of contribution towards well-being is normally determined by the magnitude and rate of goods harvested (the flow) from the natural ecosystem.

Provisioning services that contribute to well-being include:

- food;
- micro-organisms, plant and animal products;
- genetic material, biochemicals and pharmaceuticals;
- fuels/energy;
- fiber;
- non-living materials; and
- fresh water.

#### BOX 4

Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life. They maintain biodiversity and the production of ecosystem goods, such as seafood, forage, timber, biomass fuels, natural fiber, and many pharmaceuticals, industrial products and their precursors. In addition to the production of goods, ecosystem services are the actual life-supporting functions, such as cleansing, recycling, and renewal, and they confer many intangible aesthetic and cultural benefits as well.

Daily et al. 1997

**REGULATING**, or sometimes called “supporting” services, are the actual life-supporting functions ecosystems provide for the existence of humans. These are the services that are commonly forgotten or taken for granted by societies. The level of contribution towards well-being by these services is normally determined by the size and quality (the stock) of the natural ecosystem.

But exhaustive conversion of natural ecosystems into human controlled ecosystems (high flow rates) has jeopardized the continued existence of these regulating services. The absence of markets and price signals in these services has meant that changes in their conditions have gone unnoticed. It is also becoming increasingly clear that the public good nature of these services may make traditional markets redundant in addressing the issue and new methods of making sure that these services are not lost.



#### Exploring the Links

## Poverty-Ecosystem Linkages

Regulating services that contribute to well-being include:

- purification of air and water;
- mitigation of floods and droughts;
- detoxification and decomposition of wastes;
- renewal of soil and soil fertility;
- pollination of crops and natural vegetation;
- control of a vast majority of potential agricultural pests;
- dispersal of seeds and translocation of nutrients;
- maintenance of biodiversity, from which humanity has derived key elements of its agricultural, medicinal and industrial enterprise;
- protection from the sun's harmful ultraviolet rays;
- partial stabilization of climate; and
- moderation of temperature extremes and the force of winds and waves.

**CULTURAL** or enriching services of ecosystems are among the most overlooked services ecosystems provide, especially to many people in developing countries. Many of the religions and cultures in these countries believe that nature is a living entity and, in fact, their followers pray to various elements of nature. These beliefs and values surrounding natural forces have provided spiritual guidance for many societies for many generations.

But these are destroyed at an alarming rate as the ecosystems get degraded or converted into human-dominated ecosystems. The breakdown of these spiritual and cultural norms has had a devastating effect on social relations among people and their values.

Similar to regulation, the level of contribution this service provides for well-being is determined by the size and quality (the stock) of the natural ecosystem available.

Cultural or enriching services provided by ecosystems include:

- spiritual components and the relationship of people to land and water;
- aesthetic values;
- social relations and values; and
- educational and scientific value.

### HUMAN WELL-BEING-ECOSYSTEM LINKAGES

**THE** objective of this section is to establish the links between the 10 constituents and determinants of well-being and the three services ecosystems provide. We shall also attempt to identify the driving forces that underlie or influence the links. The information on driving forces or drivers, as we call them in this paper, will provide the necessary information to develop intervention strategies.

#### ■ Being able to be adequately nourished

A majority of the rural poor depend on natural food—more commonly known as wild resources—to provide for adequate nourishment. This provisioning service of ecosystems has played an instrumental role in:

- Improving diets. Many of the poor lack access to marketed food supplements and depend on wild foods to provide the nutritional variety required for well-being. For example, in Southern Venezuela, a Huottuja Amerindan village was found to receive 45 per cent of its fat intake from wild plants and only 27 per cent from wild animals.
- Providing relief during times of famine, crop failure, pest attack and drought.

However, many of these ecosystems have been converted for commercial activities with the intention that these activities will provide the poor with the resources to purchase the nourishment they need. However, empirical evidence over the last five decades shows that this conversion effect has produced mixed results with many instances whereby the poor have not only *not* benefited from the conversion of ecosystems, but have also lost an important source of nourishment, especially in times of distress.

Many reasons have been cited as to why the poor have not benefited from the conversion process, but government and market failure have been cited as two of the main reasons (Duraiappah 1998; Scherr 1999). In many instances, property rights over the provisioning component of ecosystems were not well defined thereby allowing a small elite class to capture use rights over the ecosystem (Jordan 1996; Olson 2000). This excluded the poor from their traditional sources of nourishment and denied them opportunities in the new economic activities.

The poor also use ecosystems to grow crops on a subsistence basis. These crops provide most of their daily nourishment. Declining fertility and the limited availability of water has caused many subsistence farmers to see drops in crop outputs and therefore a drop in food consumption. There are many reasons why agro-ecosystems degrade, ranging from ecological factors like drought and floods to economic, social and governance pressures. Some examples falling in the last three groups are: badly designed property rights, corrupt government officials demanding all sorts of payment for using the land and, last but not least, social pressures like the exclusion of women who work the land from land use decisions.

### ■ Being able to be free from avoidable disease

Many diseases are linked explicitly to ecological conditions. A recent study by Lvovsky indicates that approximately 20 per cent of the burden of diseases in developing countries can be attributed to ecological factors (Lvovsky 2001). For example, in 1995, 3.1 million people—80 per cent of them children—died from diarrhea (Patz 2000).

A direct causality has been established between malaria—or “man-made malaria” as specialists call it—and deteriorating ecosystems. The disease is known to flare up in ecological systems which have their regulation component altered by irrigation projects, dams, construction sites, standing water and poorly drained areas. For example, it is estimated that the deforestation and consequent immigration of people into the Brazilian interior increased malaria prevalence in the region by 500 per cent (Smith 2002). The same trend had been observed between ecological damage and other vector-borne diseases across a range of developing countries (Platt 1996).

Exposure to high levels of toxicity or pollutants for prolonged periods of time contributes to respiratory disease and kills about two million women and children each year (Smith 2002). The main diseases associated with air pollution are asthma and chronic lung disease. The concentration of pollutants increases when the natural cleansing properties of the ecosystem have been degraded. This can come about by excessive removal of flora within the ecosystem. Places with no trees obviously have more pollution than places with many trees.

The impacts of these diseases are much greater on poor people than on rich people. In a study on income impacts of malaria in Malawi, Ettlting et al. report that the direct and indirect costs from malaria consume approximately 33 per cent of household income of the poor as compared to 4.2 per cent for the rich.

Poor people are more prone to these diseases for the following reasons:

- they usually live in areas that have inadequate or no water and sanitation facilities;
- they do not have the resources to adopt prevention strategies;
- they live in areas that have higher than average air pollution;
- they cannot access cleaner fuels and, therefore, rely on traditional biomass fuels that are highly polluting; and
- they are not able to get better ventilated homes.



## Exploring the Links

### BOX 5

**It is the access to a wide range of wild foods and the resulting dietary diversity that contributes to nutritional well-being. Wild plants can have higher fat, protein, mineral and vitamin contents than cultivated species.**

The Hidden Harvest (Gujit 1995)



## Poverty-Ecosystem Linkages

### ■ Being able to live in an environmentally clean and safe shelter

A house is a place where people find solitude, comfort and pleasure; a place where the family is nurtured; and a place to sleep and rest comfortably. A safe and clean house also entails access to adequate and safe water; safe disposal of human and other wastes; the provision of drainage; the control of insect and rodent vectors of disease; controlling indoor and outdoor air quality; the use of safe building materials; protection against extreme events; and the control of noise (Cairncross et al. 1990).

Nearly half the world's population lives on less than two dollars a day (World Bank 2000). If we extrapolate the purchasing power of two dollars a day, we can speculate that many of the people in this group will not be able to afford adequate housing. In many instances, they will have no other choice but to live in undesirable habitats next to disposal dumps, industrial plants, major highways, polluted lakes or rivers, or in areas that are prone to landslides and floods.

#### BOX 6

**In Mumbai, India, a hillside gave way and the homes perched on it were swept away. Heavy rain contributed to the landslides, however, the real cause was due to the fact that low-income groups could find no land site that was safe and still close to income-earning opportunities, and to the failure of government to ensure a safer site or take measures to make existing sites safer.**

Hardoy et al. (2001).

Two questions arise from the Mumbai example (Box 6):

1. why did the landslides occur in the first place?; and
2. what could have been done to prevent them?

If the landslides occurred because of changes to the ecosystem, then it would seem that one of the regulating services offered by ecosystems has been degraded. There are many ways to restore the regulating services of an ecosystem but the process should start with a participatory process with the communities involved. We shall touch more on this in Section 3.

There are many more examples of sites becoming unsafe when ecosystem regulation services become degraded. Another example is the destruction of mangroves which removes a natural barrier against tropical storms. By re-introducing mangrove forest along the coast, poor coastal communities are provided a natural shield against coastal storms (Janssen 1996).

### ■ Being able to have adequate and clean drinking water

Let us begin with the issue of supply. One of the provisioning services ecosystems provide is water. However, destruction of watersheds and over-harvesting of water tables for human activities has caused serious disruptions in water supply. For example, the conversion of forest in the highlands in the Narok district in Kenya for commercial agriculture had reduced the flow of water down to the plains causing water shortages for people living downstream, especially the poor (Duraippah et al. 2000).

Quality of water is also a major issue for the poor in many developing countries. Although the number of people having access to piped water has increased, as of 1995, 1.3 billion people—mostly rural poor—still did not have access to clean water.

Most poor people, especially the rural poor, still depend on rivers and streams for their daily water requirements. However, many of these systems have become polluted from a variety of human activities—social activities due to lack of sanitation facilities and economic activities like industrial and agricultural pollutants—making the water unsafe not only for drinking, but also for other domestic chores like bathing and washing clothes.

The degradation of these ecosystems has forced the poor to purchase water which, in many instances, costs as much as 10 times more than what a resident in a developed country pays (UNDP 1998). This leaves many of the poor with no other option but to drink contaminated water or spend a larger portion of their income on buying water. Both alternatives affect the level of well-being and poverty.

### ■ Being able to have clean air

It is a well-known fact that ecosystems play an integral part in the cleansing of the atmosphere and regulating atmospheric content. We will not go into detail on the various geochemical cycles within ecosystems that clean air. But what we know for sure is that this component of an ecosystem—the regulating component—can be degraded by human activities if not controlled or managed in an ecologically sustainable manner (Daily 1997).

Empirical evidence points to two main sources of human disruption that have caused a breakdown of the regulating component of ecosystems to provide clean air. The first source is the excessive release of pollutants into the atmosphere thereby overloading the ecosystem and eventually causing the cleansing property to break down. The release of pollutants comes primarily from industrial activities as well as domestic activities like cooking with highly polluting fuels.<sup>1</sup>

The second source is a disproportionate conversion of the natural ecosystem into a human-dominated system.

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<sup>1</sup> Although indoor pollution does not have a direct relationship with ecosystem services, we include it because of the significant impact it has on the poor, especially the rural poor, to be able to have clean air.

To be able to have clean air, people will need to:

- live in areas that are not heavily polluted;
- live in areas that have a good balance between natural and human-dominated ecosystems;
- improve ventilation within their homes; and
- switch to cleaner fuels.

The poor have a problem satisfying these conditions for obvious reasons—it is costly. For example, economic valuation studies have all shown that land costs go up as the degree of ecological destruction goes down (Pierce 1990). We also know that ownership rights in degraded areas are the least defined thereby giving the poor relatively easy access to live in these areas (Hardoy et al. 2001).

Cleaner fuels tend to cost more than traditional biomass-based fuels. Incentives to switch to cleaner fuels in the form of subsidies have been provided in the past. The results have been mixed. Studies seem to point towards institutional and organizational failure as the two main variables at play where subsidies have failed. A combination of structural adjustment programs, corruption and inefficiency actually resulted in the poor having to pay more for cleaner fuel than the non-poor (TERI 2002).

Improving ventilation in many houses is primarily a matter of education and information. However, it should be noted that improving ventilation may increase the energy demands for warming in cold areas in developing countries. For example, leaving a window open to allow sufficient ventilation when temperatures are low may not be the best energy-saving option. It may allow an individual to achieve the ability to have clean air but it may cause a drop in the person's ability to achieve the constituent of keeping warm.



## Exploring the Links

## Poverty-Ecosystem Linkages

### ■ Being able to have energy to keep warm and to cook

About half of the world's population cooks with biomass (Scurlock and Hall 1989). The primary source of biomass is firewood followed by crop residues and animal dung when firewood becomes scarce. Empirical evidence shows that as income grows, people tend to move up the "energy ladder" from firewood to charcoal to kerosene then to liquefied petroleum gas to natural gas and finally to electricity (Leach 1987; Natarajan 1985). The main reason the poor use firewood is because it is cheaper than other fuels and also because it has been freely available.

However, biomass stoves have traditionally been inefficient. In light of the high prices of the cleaner fuels and the failure of subsidies programs to get people to switch to cleaner fuels, efforts were directed towards improving the efficiency of biomass stoves. These efforts have been relatively successful in improving efficiency. However, the impacts on health are still uncertain (Barnes et al. 1994). These improved stoves have contributed towards the capability of the poor to achieve energy sufficiency, but not clean energy. Efforts will need to be directed at making these stoves clean as well as efficient in parallel to reducing the institutional failures that have acted against the adoption of cleaner fuels by the poor.

But even if the efficiency of biomass stoves has increased, over-harvesting of firewood resources by commercial energy vendors and/or conversion of forest lands to commercial human activities has caused a significant reduction of this

free and once abundant source of energy. The impacts of this dwindling resource will impose an increasing burden on the poor to be able to achieve sufficient—leave alone clean—energy for cooking and warmth.

The increasing scarcity also would have a more pronounced impact on women and children. First, they would need to walk longer distances to search for firewood (Barnes et al. 1994). Second, they are the most exposed to the pollutants released by biomass fuels.



IFAD / G. Piazzi

Another point we need to stress here which, although not directly related to the constituent of sufficient and clean energy, is the other ecological implications accruing from the over-harvesting of firewood. Reducing forest cover causes a reduction in the ecosystem's regulating function for flood and drought control, the provision of water and regulating clean air.

### ■ Being able to use traditional medicine

Traditional medicine (TM) plays an integral part in the health care systems of the poor (von Moltke et al. 2000). Many of the poor rely on traditional medicines for many of the ailments they suffer. Culture and tradition are two important variables that can explain this dependency, but equally important is the fact that the poor have cheaper and easier access to traditional medicines than to modern health facilities. For example, the cost of modern medicine in China is approximately US\$11 per person per annum while traditional medicine costs approximately US\$1.20 per person per annum (ibid). Also, the poor have always been able to go to traditional medicine doctors without fear of intimidation. It is a system with which they are comfortable and familiar in contrast to modern medicine and hospitals.

One of the unique characteristics of traditional medicine is the variety of flora and fauna it needs. For example, it is not surprising if a single remedy may require at least 12 different herbs for the preparation. Biodiversity is an important factor in traditional medicine with the number of plants, animals and minerals used numbering around 11,559 (Jones et al. 1998).

Two factors have played a major role in preventing or reducing access to TM by the poor. The first is the commercialization of traditional medicine and the increased demand for it in many developed countries. The uncontrolled extraction of these plants and animals to meet this increasing demand has caused a significant decrease in the stock of TM plants and animals. The increasing scarcity in supply has, in turn, caused prices to move up, thereby excluding the poor from a source upon which they have always been able to depend.

### ■ Being able to continue using natural elements found in ecosystems for traditional cultural and spiritual practices

Many societies, especially rural communities in developing countries, worship many of the natural elements found in ecosystems. These can vary from flora and fauna to rivers, mountains and other inanimate objects (Chandran 1998).

Many of these spiritual and cultural elements have been destroyed as ecosystems get converted into human-dominated systems. The conversions were always done in the name of progress and economic growth. There is no doubt that these conversions had contributed towards economic progress and opulence. However, the issue at hand is the exclusion of the poor from taking part and reaping the benefits resulting from these economic opportunities.

But maybe more importantly, we should ask ourselves if this is the path that the majority in the country wanted to take, or whether it was the wish of a small elite intended for the well-being of the masses. It is becoming increasingly obvious and clear that the decision to change or convert ecosystems, especially those that have spiritual and cultural values, must be a decision that comes from a participatory process involving the communities (Berkes 2002).



## Exploring the Links

### ■ Being able to cope with extreme natural events including floods, tropical storms and landslides

One of the many regulating services ecosystems provide is the mitigation of floods, landslides and the impacts of storms. The removal of forest cover for commercial and/or subsistence activities leaves hillsides vulnerable to soil erosion and increases the probability of landslides as well as floods. Many of the commercial as well as subsistence activities are subsidized by government policies in order to encourage economic activities in marginal areas that otherwise would have not been used (Duraiappah 1998).

## Poverty-Ecosystem Linkages

The same can be said for the removal of mangrove forests along the coasts of many developing countries. One of the main activities that was encouraged in mangrove forests was shrimp cultivation. Not only did the conversion of mangrove forests into shrimp ponds remove a natural barrier against tropical storms, it also removed a system that cleaned coastal waters and provided a breeding ground for many aquatic species upon which poor coastal communities depended for their nourishment (Janssen et al. 1996).

Poor people tend to suffer more than others when extreme events like floods, tropical storms and landslides occur. This happens for three reasons. First, they live in areas and in shelters that are more susceptible to these extreme events. Second, they do not have the resources to cope with these events. Third, the poor in developing countries cannot depend on social opportunities like safety nets to cushion the impacts of extreme events (Sen 1999).

### ■ Being able to make sustainable management decisions that respect natural resources and enable the achievement of a sustainable income stream

Natural resources are among the main sources of income for the poor. The resources are not only used for subsistence farming activities but also for commercial crops like coffee, tea, rubber and, more recently, aquatic products like shrimp and fish. All of these activities can provide a sustainable stream of income only if the ecosystem is managed in a sustainable manner.

However, unsustainable activities have caused ecosystem degradation. Over-harvesting has caused a reduction of flow from the provisioning component. For example, over-fishing along the coastal waters by commercial fishing trawlers has reduced the stock of fish for the artisanal fishing community, thereby pushing many of these communities into poverty.

Over-use has caused the degradation of the regulation component. For example, ecosystems lose the ability to generate and renew soil and soil fertility—a regulating service—when soil is used intensively for long periods of time and with heavy use of fertilizers.

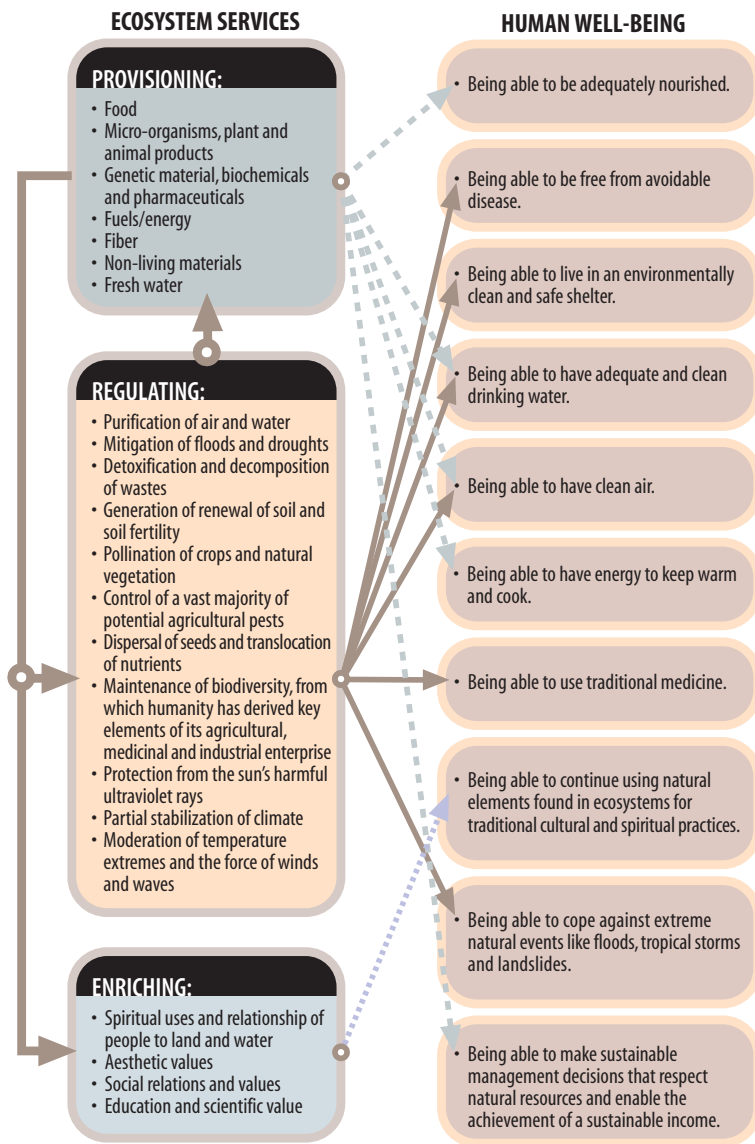
Unmanaged conversion of ecosystems into human-dominated systems has caused serious disruptions to the services provided by the ecosystems. For example, removal of forest or soil cover to make way for commercial activities have caused a drop in water supply—a provisioning service. A double effect of soil degradation and loss in water supplies can create a substantial loss in income for the poor. The poor, unlike the rich, have limited financial resources to compensate for the loss of these ecological services with technological solutions.

Another important dimension is that the poor depend on many natural resources that come from common property resources. This in effect implies that they have limited control over the use of these resources if the institutions of common property are not transparent and equitable. Moreover, the trend towards the privatization of these resources has caused many of the poor to lose access to the resources through social and/or economic exclusion caused by the lack of institutional restructuring to adapt to the new property rights regimes (Olson 1965; Ensminger 1997).

### SYNOPSIS OF LINKAGES

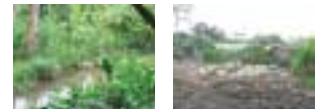
The following recurring themes were observed from the discussion on poverty-ecosystem linkages presented above. They are:

- a close relationship between many of the constituents of well-being and the provisioning, regulating and enriching components of ecosystems (see Figure 1);
- a close interdependency among the constituents of well-being with each other and the synergy we can reap for achieving the constituents by addressing one or more constituent;
- the provisioning service of ecosystems is highly influenced by the regulating services (see Figure 1). Over-harvesting, over-use, misuse or excessive conversion of ecosystems into human or artificial systems damages the regulation service which in turn reduces the flow of the provisioning service provided by ecosystems;



### SYNOPSIS OF LINKAGES (CONTINUED)

- exclusionary practices—intentional or unintentional—by the “non-poor” prevented the poor from having access to the various services offered by ecosystems;
- the poor bear a disproportionately heavy burden of the impacts of ecosystem degradation that, in a majority of cases, were caused by the “non-poor”;
- the poor are excluded from participating in an equitable manner in the commercial activities that were introduced into converted ecosystems; and
- there are a variety of drivers influencing the links between well-being and ecosystems. Some of the main drivers observed are:
  - institutional failure;
  - lack of appropriate instruments;
  - inefficient government agencies;
  - lack of participation and involvement by the poor in decision-making;
  - lack of economic facilities;
  - lack of social opportunities like safety nets;
  - gender-based exclusion;
  - lack of ecological security in terms of protection from adverse events; and
  - distrust of bureaucracies and formal institutions due to lack of transparency surrounding common property resources and the equitable transfer of rights during privatization.



### Exploring the Links

**FIGURE 1.** The links among ecosystem services and human well-being.  
(Source: Duraipappah 2002)

## Policy Options to Improve Well-being through an Ecosystem Approach

In the previous section, we highlighted some of the links between the 10 constituents of well-being and ecosystem services. The section also highlighted some of the drivers for the destruction of ecosystems and the resulting prevention of the poor from achieving the various constituents of well-being.

In this section, we are interested in developing a response strategy to correct for drivers that are destroying ecosystems as well as inhibiting the poor from accessing and using ecosystem services. In order to provide a systematic framework, we have classified the drivers into the following four broad categories:

1. Economic Drivers
2. Governance-related Drivers
3. Social Drivers
4. Ecological Drivers

**I**n order to correct or remove the drivers, we need to approach the problem in an integrated fashion. We believe that there are two components to a successful policy intervention strategy. The first component looks at the tools of intervention while the second focuses on the enabling conditions needed for the successful development as well as implementation of the tools.

We classify instruments, institutions<sup>7</sup> and organizations as tools. The difference between the approach taken here and other existing policy frameworks is the integration of instruments, institutions and organizations within a single frame of reference. Policy options have, in a majority of cases, been approached in a partial manner. Policy intervention strategies are either focused primarily on the development of an instrument or an institution to achieve an outcome. For example, a subsidy on kerosene—an instrument—is usually used by many developing countries as an incentive for the poor to switch from firewood to kerosene. But in many cases, the subsidies did not work because the institutions and organizations needed to implement the instrument were not put in place or were inefficient and ineffective in the implementation of the policy. We believe that a policy strategy should look at all of the following three components in an integrated manner:

- 1] Instruments – market and non-market
- 2] Institutions – formal and informal
- 3] Organizations – public, private and civil

The second critical component is the use of an overarching framework to provide the enabling conditions for the successful development and implementation of the tools. In this publication, we develop a framework embracing the concept of freedoms. As mentioned earlier, we want to go beyond just delivering the constituents and determinants of well-being and focus instead on increasing the capability of the poor to achieve well-being by creating the enabling conditions for such a process to occur.

For tools to be developed and implemented successfully, it is becoming increasingly clear that people need a variety of freedoms in order to make sound decisions on the type of instruments, institutions and organizations they want. It is important to note here that many of these freedoms have both an instrumental and constitutive value for well-being but for policy implementation purposes, we will focus primarily on the instrumental perspective; in other words, as a means to achieve a desired end—well-being.

<sup>7</sup>By institutions, we mean the rules that govern the way individuals within a society behave. Ideally, these institutions should be developed through a democratic and participatory process.

We identified six classes of instrumental freedoms that we believe will address the four broad categories of drivers—economic, social, governance-related, and ecological—highlighted earlier. These are:

- 1] **participative freedom;**
- 2] **economic facilities;**
- 3] **social opportunities;**
- 4] **transparency guarantees;**
- 5] **protective security; and**
- 6] **ecological security.**

The first five freedoms have been put forward by Nobel Laureate Amartya Sen. We have extended the list to include ecological security as an important freedom for well-being (Duraiappah 2002).

#### ■ Participative freedom

Participative freedom allows people to be involved in an active manner without intimidation or fear in deciding on issues related to their well-being. Participation becomes desired for its potential to empower those who previously have been marginalized and excluded from the development process (e.g., the poor, women, the disabled, etc.).

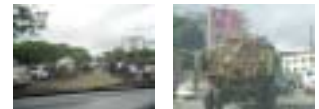
Participation is also valued for its intrinsic and instrumental ability to increase self-esteem, confidence and an individual's sense of power. Moreover, increasing individuals' sense of self-esteem and confidence goes a long way towards increasing a community's sense of wealth and well-being.

In this particular case it would be the freedom to take part in the deliberations on the use of ecosystems in which they live, in ways they value. As Sen has noted: "Many of the more exacting problems of the contemporary world—ranging from famine prevention to ecological preservation—actually call for *value formation through public discussion*" (Sen 1993 p. 18).

However, the term "participation" means different things to different people depending on their development ideology and the context in which they are applying it. But we know for sure that participation involves a shift in power

over the process of development away from those who have traditionally defined the nature of the problem and how it may be addressed (governments, outside donors) to individuals and communities directly impacted by the issue. At its pinnacle, participation involves a transformation of the traditional development approach towards the enhancement of the capabilities of the local people and communities to define and address their own needs and aspirations (Sen 1999).

In order to facilitate participative freedom, we need to not only have the necessary instruments to facilitate participation, but also the institutions and organizations. There have been many instances when participatory processes have been attempted but the institutional structures for the instruments to be used effectively and efficiently were either non-existent or inadequate. For example, public forums and participatory poverty assessments (tools or processes) are of limited use if there is no formal or informal institution that legitimizes them. It would be an exercise in futility if the results from these processes do not have to be heard and/or acted upon by the government.



### Exploring the Links





## Policy Options to Improve Well-being through an Ecosystem Approach

**ORGANIZATIONS** are also critical in facilitating the process of participation. People—and especially poor people—need assistance in getting organized and articulating their views and positions on issues. For example, non-governmental organizations have been instrumental in helping the poor organize and push for changes in natural resource management and the use of ecosystems in India (Chopra 2001).

### *Participative freedom—strategic interventions*

- Establish democratic processes to allow individuals to decide on issues related to well-being and ecosystem management.
- Allow a process for value formation and the creation of an environmental ethic through public discussion.
- Provide the means by which the impoverished can organize and articulate their views and positions on ecosystem management.

### ■ Economic facilities

One of the reasons the poor are not able to take advantage of the various provisioning services offered by ecosystems is because of the lack of economic facilities. Economic facilities relate to the enabling conditions that individuals need for converting the provisioning services (the natural resources) for production and/or exchange. We identified the following two factors that play a critical role in helping individuals, especially the poor, to earn a sustainable income from the provisioning services offered by ecosystems:

- 1] **Clear ownership of and easy access to a variety of resources needed to make the conversion of natural resources into economic activities successful.**
- 2] **Low transaction costs for transforming the provisioning services into income.**

### *Clear ownership of and easy access to resources*

Of the main reasons the poor are excluded from taking advantage of the provisioning services offered by ecosystems is the lack of well-defined rights over these services, or “natural resources” as they are more commonly called in the literature. In the past, many of the natural resources upon which poor people depend for income generation were under common property regimes governed by informal institutions. The breakdown of these traditional or informal institutions by the emergence of formal private property right regimes has caused many of the poor to lose access to these resources. They have either been crowded out by others more wealthy and powerful who can either outbid them in the purchase of these resources, or have simply been bought out by these elite groups (Rutten 1992).

One of the main reasons the poor sell their resources, or are not able to convert the resources into economic goods, is the lack of financial resources or access to the resources needed to undertake economic activity. However, the development of micro-credit schemes have gone a long way in bringing this barrier down in some developing countries and needs to be encouraged in other countries.

But providing financial help is just one element. Another important component for economic success is access to information—knowledge that will allow the poor to manage their resources in the most economically efficient and ecologically sustainable manner.

The lack of information on prices, markets, opportunities, environmentally sound technologies, etc. has been one of the driving forces for the poor to use the natural resources they own in unsustainable ways *vis-à-vis* the “non-poor” (Amman 2001). This is especially true in the case of ecologically friendly technology that can prevent the degradation of the natural resource systems they own while allowing them to achieve a sustainable income stream.

**Low transaction costs for transforming the provisioning services into income**

In his seminal work on firms, Coase demonstrated that firms incur transaction costs in the process of converting inputs into outputs for markets and firms try to reduce these transaction costs by a variety of means. But transaction costs are not just restricted to firms. Individuals also face transaction costs in the daily activities they carry out. The problem occurs when the poor incur higher transaction costs in relative and, in some instances, absolute terms *vis-à-vis* the “non-poor” (Chopra & Duraipappah, forthcoming).

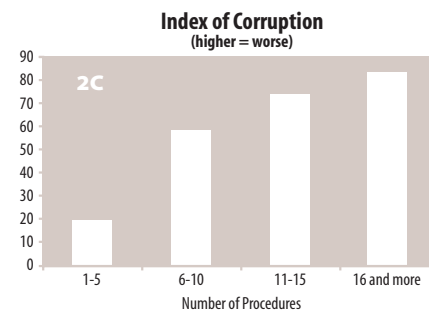
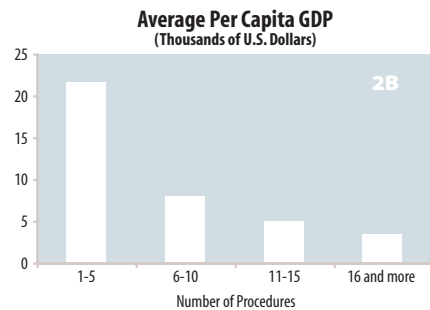
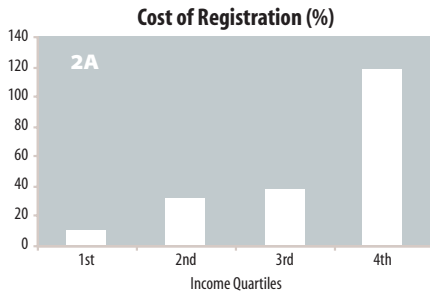
The poor incur higher transaction costs of two types. We call the first type “process” transaction costs, occurring when natural resources are converted into economic goods. The second type of transaction costs are “marketing” transaction costs and occur when goods are sold through the markets.

Typical examples of process transaction costs are:

- *The costs paid for the installation of services like water and energy needed for economic activity.* Many reasons can be cited for higher costs, but the most common one is corrupt authorities demanding bribes and favours for installing these services. Another common reason is the higher unit cost because the poor are not able to achieve economies of scale to reduce unit costs.
- *The higher processing costs the poor have to pay for conducting their business activities.* These can vary from business permits to land registration costs. In many instances, they have to not only pay for the permits but also pay a bribe to be able to get the permit. This is especially true when there are restrictions on the number of permits available (see Figures 2A – 2C).
- *The time spent in administrative offices filing forms and, more often than not, paying translators to help them fill the forms in the first place.* It is also normal for the poor to be pushed from one government agency to another in order to get a single task accomplished.



**Exploring the Links**



**FIGURES 2A – 2C.** Relationship among corruption, transaction costs and administrative bureaucracy. (Source: *World Development Report 2002*, The World Bank.)

## Policy Options to Improve Well-being through an Ecosystem Approach

Market transaction costs arise when the poor attempt to get their goods to market. Typical examples of market transaction costs are:

- *High information search costs for finding markets and the “right” prices.*
- *The lack of information forces many of the poor to sell their goods to “middle men” at substantially lower-than-market prices.*
- *Time spent on filling in large volumes of complex administrative forms in order to access international and sometimes even domestic markets. The lack of knowledge on these procedures forces them to use “middle men” which increases their transaction costs in terms of lower prices or wrong information.*

Providing economic facilities entails providing opportunities. These come in the form of well-defined property rights over the access, use and the conversion of natural resources the poor own into a sustainable income stream. Opportunities can also be increased if the poor have access to the additional resources needed to convert natural resources into sustainable income streams. But opportunities can be reduced if the transaction costs of carrying out economic activities become prohibitively high in comparison with the revenues earned from the natural resources. A combination of instruments (land titles), institutions (land tenure acts) and organizations (land offices) will be necessary to address the issue of ownership status of natural resources. The same can be said for lowering the various types of transaction costs.

### ***Economic facilities—strategic interventions***

- Establish clear ownership or rights and easy access to ecosystems and ecosystem services.
- Reduce transaction (processing, administrative, information) costs for converting ecosystem goods into economic products.
- Provide financial resources in the form of micro-credit.
- Provide information on prices, technology and market opportunities in a timely and consistent format.



*DSK Designs*

## ■ Social opportunities

Sen defines social opportunities as the arrangements society makes for education, health and so on for all members in order to allow them to live better lives and be productive members of society (Sen 1999). In this publication we specifically address issues related to gender—in particular, women's agency—and children under this category. It is well documented in the literature that poor women and children are much more susceptible to becoming impoverished from ecosystem degradation.

There are many reasons for women and children to be more prone, but one of the main issues deals with social and cultural values inherent in the society. Many of the traditional chores involving ecosystem uses, including collecting firewood and subsistence farming, are assigned to women and children. However, in contrast, decision-making structures on defining user rights over these resources have traditionally been in the hands of males.

Past interventions to improve the well-being of women and children have had marginal success. Many of the policies have ignored or marginalized the critical role and influence informal institutions have in poor communities. For example, informal institutions that give boys a higher status than girls, deny women ownership of property rights or user rights over resources and/or entitlements, and do not allow women to express their views. Experiences in many developing countries have shown that these informal institutions have acted as barriers towards the successful implementation of instruments and formal institutions to improve the status of women in society (O'Neill 1993; Sen 1999).

Social opportunities in the form of women's networks are critical instruments that have been used over the last decade to improve the agency aspect of women. These networks created their own informal institutions which then challenged the existing institutional structures and, over time, became accepted by others in society as a legal entity with equal rights. Work needs to be focused on creating these types of networks with respect to the user rights and ownership of ecosystem services that are critical for women and children to improve their well-being.

## *Social opportunities—strategic interventions*

- Promote women's agency by providing support for women's networks and the creation of informal institutions.
- Provide basic health facilities.
- Provide clean water.
- Provide safe and clean shelter.
- Provide basic education on ecosystems and their links with human well-being.

## ■ Transparency guarantees

Transparency guarantees relate to openness and trust. In any society where there is no trust among members and, more importantly, when people lose trust in their leaders, the potential for anarchy and chaos is high (Ritzen 2000). Two constant variables we see in many developing countries plagued by social, economic and environmental disaster are:

- high levels of corruption in the bureaucracy, the polity, the judiciary and business; and
- high levels of inefficiency in the bureaucracy, polity, judiciary and private sector.



## Exploring the Links

### *Corruption*

Corruption is a perverse feature of many societies. Its eradication depends on long-term structural policies, and solutions vary according to the level of institutional and legal development prevalent in the countries. Corruption is not restricted to any particular socio-economic level. It is most damaging when it becomes endemic and it is accepted as a norm rather than the exception.

Corruption increases the costs for the poor as they now have to allocate a certain portion of their income for bribes. It is not uncommon to hear of the poor having to pay bribes even to get food rations. But corruption is not just about higher costs; it goes to the core of trust. Corruption is a cumulative causation process that creates an atmosphere of mistrust among people and is known to be one of the driving forces behind the breakdown of the social fabric within societies (World Bank 2002).

## Policy Options to Improve Well-being through an Ecosystem Approach

### **Inefficiency**

Inefficiency can occur for many different reasons. Some of the main reasons cited for developing countries are:

- low human capital capacity;
- low policy coherence;
- low accountability and responsibility; and
- high subsidies.

The first three factors relate primarily to inefficiencies in the bureaucracy, polity and judiciary while the last factor creates inefficiencies primarily in the private sector. All four factors have been known to have adverse impacts on ecosystem management. For example, the lack of knowledge in environmental ministries on the links between poverty and ecosystem has caused a vacuum of policies focused on ecosystem management that can reduce poverty.

The same can be said of the low policy coherence among the various ministries within a country. For example it is not uncommon to find the agricultural ministry initiating a policy to encourage intensive aquaculture in order to increase the incomes of the poor, but without knowledge that the land office has stringent procedural rules that make it difficult for the poor to carry out aquaculture. This is further compounded by the environmental regulations the environment ministry has on coastal water quality and the level of waste water these farms can dump into the coastal waters. A coherent policy package that involved all three ministries together with the farmers may produce a sustainable aquaculture farming sector that would benefit the poor through the proper use of ecosystem services.

Subsidies have also been known to create inefficiencies in the use of ecosystem services. The formulation of subsidies needs careful scrutiny and, in most cases, should have a time clause that stipulates exactly when a subsidy must be retired. The problem with most subsidies is that they become entrenched within the system and the private sector becomes complacent with these in force. The level of competition goes down and inefficient production or consumption patterns have been documented to cause serious ecosystem degradation. Moreover, most subsidies targeted towards the poor end up providing benefits to the “non-poor” instead of the poor. This occurs primarily because of corrupt and/or inefficient government officials.

Improving the level of trust will involve a concerted action by all stakeholders in the community working together, especially the marginalized groups. Participatory freedom will be a complementary instrumental freedom that will foster this process. The instruments used—subsidies, for example—will need to be re-analyzed through a lens that focuses primarily on poverty reduction by addressing sustainable ecosystem management. And, last but not least, the institutions governing trust, like the judiciary, and traditional institutions governing community behaviour will need to be revised, or new institutions will need to be created to address the poverty-ecosystem nexus.

### **Transparency guarantees—strategic interventions**

- Reduce corruption in public and private sector.
- Increase efficiency and effectiveness in the bureaucracy, polity and judiciary.
- Improve policy coherence among local, national and international environmental, economic and social policy frameworks.

## ■ Protective security

Protective security is defined as safety nets against adverse events that may render individuals helpless. The most common example is unemployment benefits that are given to individuals when they lose their jobs. However, this is only the case for those employed in the formal sector. Moreover, safety nets of this form are only available in developed countries with many developing countries citing these as luxuries that they cannot afford.

However, this is not to say that developing countries or those involved in the informal sector have no social nets to help them during times of stress. Studies by Putnam and others have demonstrated how societies develop informal safety nets in the form of family and community support mechanisms. It is not uncommon to find families joining together to help other family members who have fallen on hard times. In similar fashion, communities have been known to provide assistance in the form of extra grazing or water rights to those who are in dire need of these goods to help them weather adverse events.

But many of these informal safety nets have been collapsing with the advent of commercialization and migration. Immigrants from rural areas to the cities find themselves alone and are unable to access the customary family support systems they had in the past. The recent trends in privatization have also closed the ability of communities to share common resources during times of stress. The traditional common lands that were reserved and kept as insurance for times of duress have all been lost through new private land tenure systems (Rutten 1992; Amman and Duraipapp forthcoming).

### ***Protective security—strategic interventions***

- Create formal safety nets that automatically provide benefits during times of stress.
- Maintain existing informal safety nets used by communities.
- Recognize and formalize existing informal safety nets when private land tenure systems are being formulated.
- Create work (restoration of ecosystems) for food programs during times of extreme distress.

## ■ Ecological security

We define ecological security as the provision of ecological safety nets to individuals who depend on ecosystem services for achieving many of the constituents of well-being.

The specific form of an ecological safety net would depend on the community and its links with the ecosystems. The actual specification of the ecological safety net should of course be determined by all individuals within the community. And this process of self determination can, of course, only materialize if individuals have participative freedom.

The move to ecological security as a freedom, both from a constitutive as well as instrumental perspective, implies a significant move away from the traditional approach of treating ecosystem services purely as private goods to be extracted, produced, consumed and exchanged through the market. By defining ecological security as a freedom, we assert that regulating and enriching ecosystem services should be treated as constitutive elements and a human right to which all individuals are entitled. This is not a new concept and has actually been invoked by many rural communities. The story in Box 7 by Indian ecologist, Madhav Gadgil, illustrates how this freedom was developed and also how it is being threatened.



### **Exploring the Links**

## BOX 7

**Sacred groves: Securing a recruitment of seeds and maintaining landscape patchiness (Gadgil 1989)**

Indian ecologist Madhav Gadgil writes about how he first discovered sacred groves in west central India:

The hill ranges of the Western Ghats are close to the heart of every Maharishtrian. So my thoughts naturally turned to fieldwork on the forests of these hills when I returned from six years of theorizing at Harvard. After three months of wanderings on the Western Ghats I received a remarkable letter. It was from a tiny village, Gani, located in a remote area of Konkan. The villagers had learned, the letter said, of my interest in sacred groves. Their particular village had one of the best, and it had recently been marked for felling by the Forest Department. Could I come over and help them save it from this fate? Intrigued, I promptly took a bus to Srivardhan and then trekked over eight kilometres of barren hills to Gani, a hamlet of 40 juts.

Above the settlement was a beautiful patch of rain forest, some 25 hectares in extent, in the catchment of the stream that ran past the village. The villagers had witnessed other streams drying up as tree cover had been lost over the last forest. Fortunately, I was able to

persuade the Forest Department to abandon plans to fell this sacred grove. In the process I discovered that many foresters thought of it as a stand of overmature timber. For the villagers, though, it evidently was something more. In fact, they were aware of its value not only for water conservation, but also as a gene bank. For they showed me a specimen of the magnificent leguminous climber *Entada pursaetha* in another grove and explained that its seeds were of great use in treating snakebite among cattle. People came from as far as 40 kilometres away to collect seeds from that grove.

The sacred grove is undoubtedly an ancient tradition in India. For example, we learn from the story of Buddha's life that he was born in a sacred grove in the sixth century B.C. These groves have been preserved over time not because of any economic or practical arguments but rather on the basis of religious beliefs. The benefits of sacred groves accrue to the social group on a long-term basis; the individuals often would be better off in the short run by violating the grove. It seems probable that cultures have cast prescriptions that lie in the long-term interest of the group and against the short-term interest of individuals, in the form of religious sanctions.

Source: Fikret Berkes and Carl Folke (2002)

**THE** declaration of the regulating and enriching services as a human right is the easy part. The difficult part is the portioning of the ecosystem into the three services. As we saw in Section 2, the provisioning service of an ecosystem is dependent in part on the regulation component, and excessive use of the provisioning component damages the regulating and enriching components. The challenge for society is to determine the critical levels or safe minimum standards necessary if ecological security is to be provided as an instrumental freedom. And this can only be achieved if another instrumental freedom—participative freedom—is provided (see Box 8).

The lack of participative freedom may explain the limited success of many multilateral environmental agreements (MEAs). The MEAs can be considered as a first step towards making ecological security a basic freedom, but the process can be improved. Many of these agreements were formulated in a top-down manner with very little participation from the local communities actually working in and with ecosystems.

Another problem with many of the MEAs is the lack of capacity by many developing countries to analyze the social and economic impacts of these

agreements and the institutional prerequisites necessary for efficient and equitable implementation. Moreover, there is not that close of a link between the MEAs and poverty reduction. One possible way to forge a closer relationship between the MEAs and poverty reduction is to design MEA-implementing instruments like the Global Environment Facility (GEF) in a manner that contributes towards poverty reduction through the sustainable management of ecosystem services.

### BOX 8

Much of the prior discussion has suggested that the life-supporting characteristics (in this case, the regulation constituency) may be resolved by recognizing that some issues can be appropriately managed through the markets while others require the application of the “safe minimum standard” (SMS) approach to protect the essential life-supporting services of ecological systems.

*The safe minimum standard posits a socially determined, albeit “fuzzy” dividing line between moral imperatives to preserve and enhance natural resource systems and the free play of resource trade-offs. Following a safe minimum standard, society would rule out actions that could result in natural impacts beyond a certain threshold of cost and irreversibility. Central to the safe minimum standards approach are the role of decision-making and the formation of societal values (Toman 1995).*

One of the challenges of the SMS approach is the identification of the standards. The Global Environmental Outlook (GEO) and the Millennium Ecosystem Assessment (MA) are two UNEP-supported programs that can provide valuable input into this process. But science is only one side of the coin. The other is the willingness of society to adopt the SMS recommendation; especially in light of the poverty alleviation programs currently advocated by policy-makers and stakeholders at all levels.

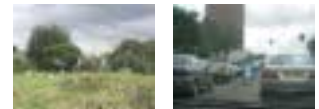
### Ecological security—strategic interventions

- Allow communities greater participative freedom to determine sustainable management of ecosystems and ecosystem services.
- Establish formal institutions to protect ecological safety nets established by local communities.
- Ensure coherence among multilateral environmental agreements with national and local environmental policies.
- Build capacity among local communities for establishing ecological security and ecological safety nets.
- Promote institutions to ensure fair distribution and the use of ecological safety nets by local communities.

### FREEDOMS AND THE INSTITUTIONAL FRAMEWORK

**THE** one critical message we get from the discussion above is that the six freedoms are not mutually exclusive and they can be both instrumental as well as constitutive. In fact, they complement and reinforce each other. For example, it would be difficult to have ecological security without participative freedom. In similar fashion, it would be meaningless for women to have all the economic facilities available but social opportunities are not available for them to access these facilities and there is a lack of participative freedom for them to voice their concerns and frustrations to get things changed.

Another important concern highlighted in this section is the integration of instruments, institutions and organizations. In many cases, instruments have been developed, but without any concern of the underlying institutions and organizations needed to implement the instruments. In other instances, institutions had been created but with no instruments developed to address distributional issues that may arise from the implementation of the institution.



### Exploring the Links



## Policy Options to Improve Well-being through an Ecosystem Approach

**IT** was also observed that organizations need to have the capacity to implement instruments and institutions and, in many cases, this gap has been either ignored or too little effort has been placed on improving and increasing capacity.

### POLICY COHERENCE

**THE** human well-being-poverty-ecosystem nexus, as illustrated above, is governed by a complex system of institutions, organizations and instruments. These vary from policies at the international scale right down to the local community. Moreover, within each level, there is again a multitude of instruments, organizations and institutions at work. Coherence among policies within and across the scales is a necessary condition if intervention strategies are to be successful.

### VERTICAL COHERENCE:

International conventions must be coherent with national policies and these in turn must be coherent with local policies. Vertical coherence calls for the development of intervention strategies that integrate instruments, institutions and organizations across these scales.

### HORIZONTAL COHERENCE:

Horizontal coherence refers to coherence among policies within each scale. For example, this requires actors at the international level to work together and make efforts to ensure that their policies complement each other (OECD 2001). The same is true for the national level. Ministries must work together to aim for a common goal. Their plans and strategies must be complementary to each other and trade-offs among their plans must be highlighted, discussed and agreed upon before actions are implemented.

### INSTRUMENTS AND INSTITUTIONAL COHERENCE:

There are 13 global multilateral environmental agreements (MEAs) and/or conventions and approximately 500 international treaties or other agreements related to the environment. Couple this with an equally large number of poverty reduction plans and development strategies and we get a complex policy arena with the potential for many conflicting objectives and goals. Problems occur when instruments or institutions working at one scale come into conflict with an instrument or institution operating at the same scale or at another scale. It is therefore good practice to check for vertical and horizontal coherence among the instruments and institutions advocated in a policy change.



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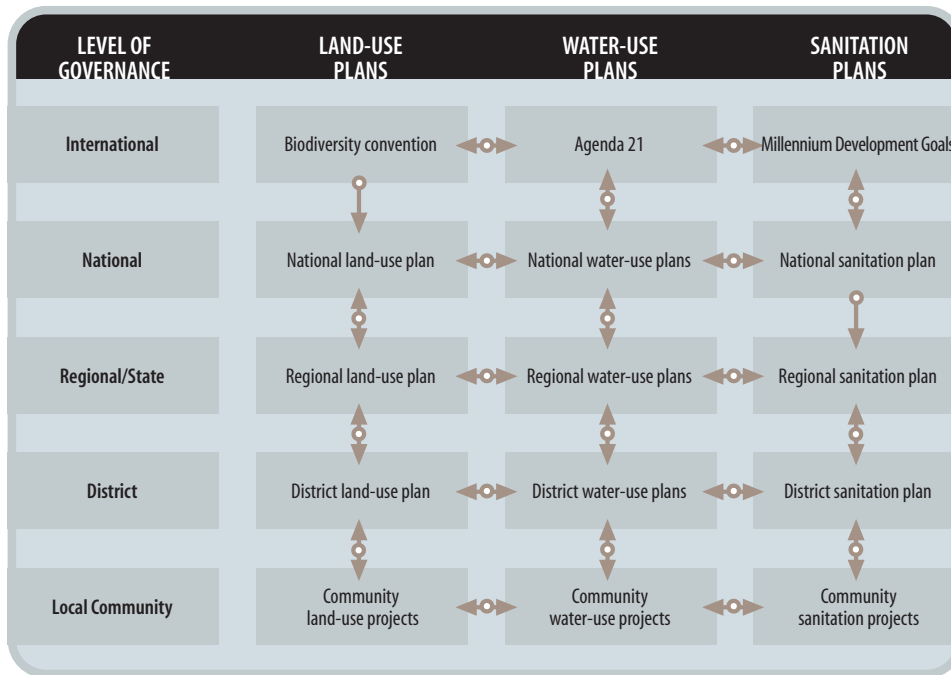
**ORGANIZATIONAL COHERENCE:**

At the international level, each MEA has its own secretariat. At the national level, the responsibilities for the environment, poverty reduction and development strategies are spread across a variety of ministries. It is imperative for these conventions at the international level and ministries at the national level to work together towards common goals and objectives. An organizational matrix should be established describing who (organization) is responsible for what (institutions and instruments). This will provide some guidance in avoiding conflicts among the various organizations responsible for executing the strategy. In a similar vein to instruments and institutions, the organizational component of response options should be tested for vertical and horizontal coherence.

The overall objective for policy coherence will be to:

- reduce fragmentation;
- reduce duplication; and
- reduce transaction costs.

**FIGURE 3.** Vertical and horizontal policy coherence.



**Exploring the Links**

## Policy Options to Improve Well-being through an Ecosystem Approach

### A SYNTHESIS OF THE CONCEPTUAL FRAMEWORK

**THE** main lessons learned from an analysis of the human well-being-poverty-ecosystem nexus are:

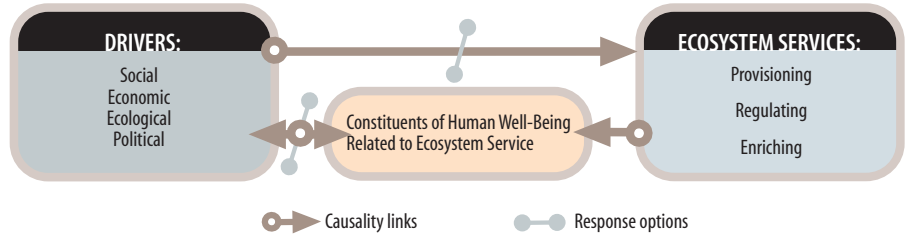
- 1] There are close inter-dependencies among the 10 constituents of well-being and the provisioning, regulating and enriching services ecological systems provide.
- 2] Although there is potential for trade-offs between the three services of ecological systems to meet the various constituents and determinants of well-being, there is also potential for synergy.
- 3] The main drivers that influence human well-being and ecosystems can be categorized into the four broad categories of social, economic, ecological and governance-related.
- 4] Participative freedom, economic facilities, social opportunities, transparency guarantees, protective security and ecological security are six instrumental freedoms necessary if poverty reduction efforts through an ecosystem approach are to be successful.
- 5] Policy intervention or response strategies to reduce poverty through an ecosystem approach should be developed in a framework that embraces the six instrumental freedoms through an integrated approach using a combination of instruments, institutions and organizations.
- 6] Response options can be designed to intervene at two points. The first intervention can come at redesigning existing drivers or formulating new drivers to have a direct impact on any one of the constituents of well-being related to ecosystem services. The second intervention can come when addressing drivers having a direct impact on ecosystem services.



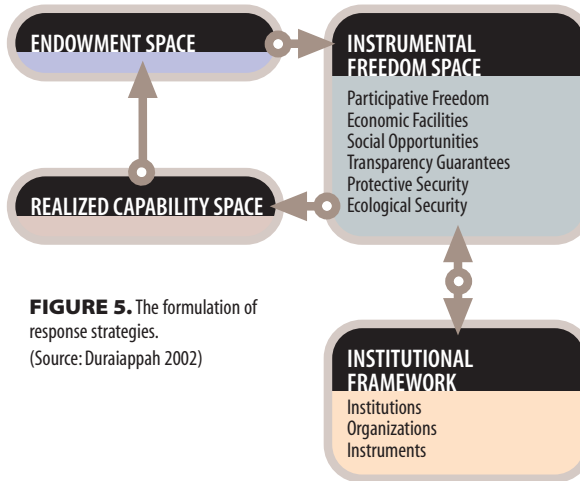
IFAD / G. Pirozzi

The diagram in Figure 4 gives a simplified and abridged schematic illustration of the conceptual framework.

**FIGURE 4.** The conceptual framework linking human well-being and ecosystem services.



The schematic illustration in Figure 5 describes in a little more detail how response strategies are formulated using the combination of instrumental freedoms and the corresponding institutional framework.



**FIGURE 5.** The formulation of response strategies.  
(Source: Duraipapp 2002)



**Exploring the Links**

## The UNEP Poverty-Ecosystem Process

**WE** began the paper by developing a conceptual model to substantiate our position that the enriching and regulating services of ecological systems can be used by the poor to meet many constituents and determinants of well-being. Figure 6 provides a schematic illustration of a generic process that illustrates how we intend to operationalize the conceptual framework we presented in this paper.

### STAGE 0 – SETTING THE STAGE

This stage is a review of existing initiatives on the poverty-environment nexus to identify what has been done and what information is available and, from there, make an assessment of what is still needed. Results from this review will, in essence, set the stage for the subsequent work to be done. We have not formally inserted Stage 0 in Figure 6 because results from this stage will be used in nearly all stages. We have indicated, when necessary, within each stage, the need to draw on lessons learned from other initiatives.

### STAGE 1 – POVERTY ASSESSMENT

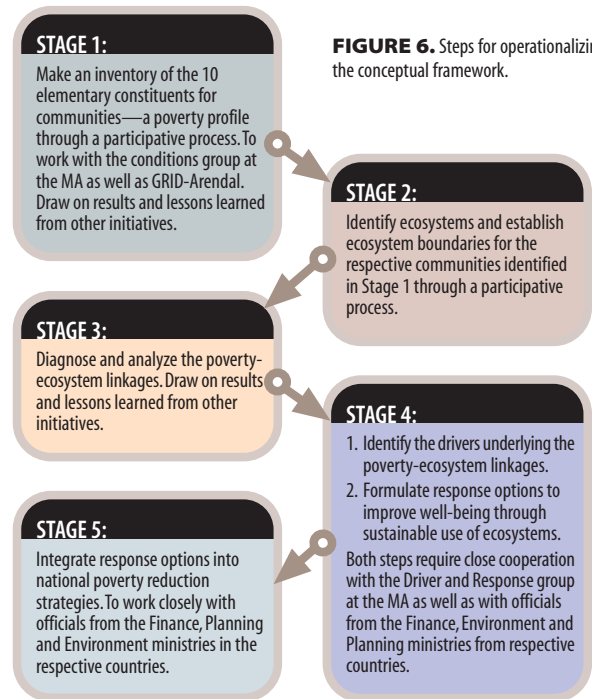
There are a number of techniques available to carry out a poverty assessment. The most popular and common technique is the Participatory Poverty Assessment (PPA). We need to be careful to avoid the use of macro or aggregated statistics as these tend to hide pockets of poverty within geographical boundaries. A participatory assessment is essential as this will allow us to also collect information on why the poor think they are poor and the barriers they think are preventing them from achieving their well-being.

### STAGE 2 – AN ECOSYSTEM ASSESSMENT

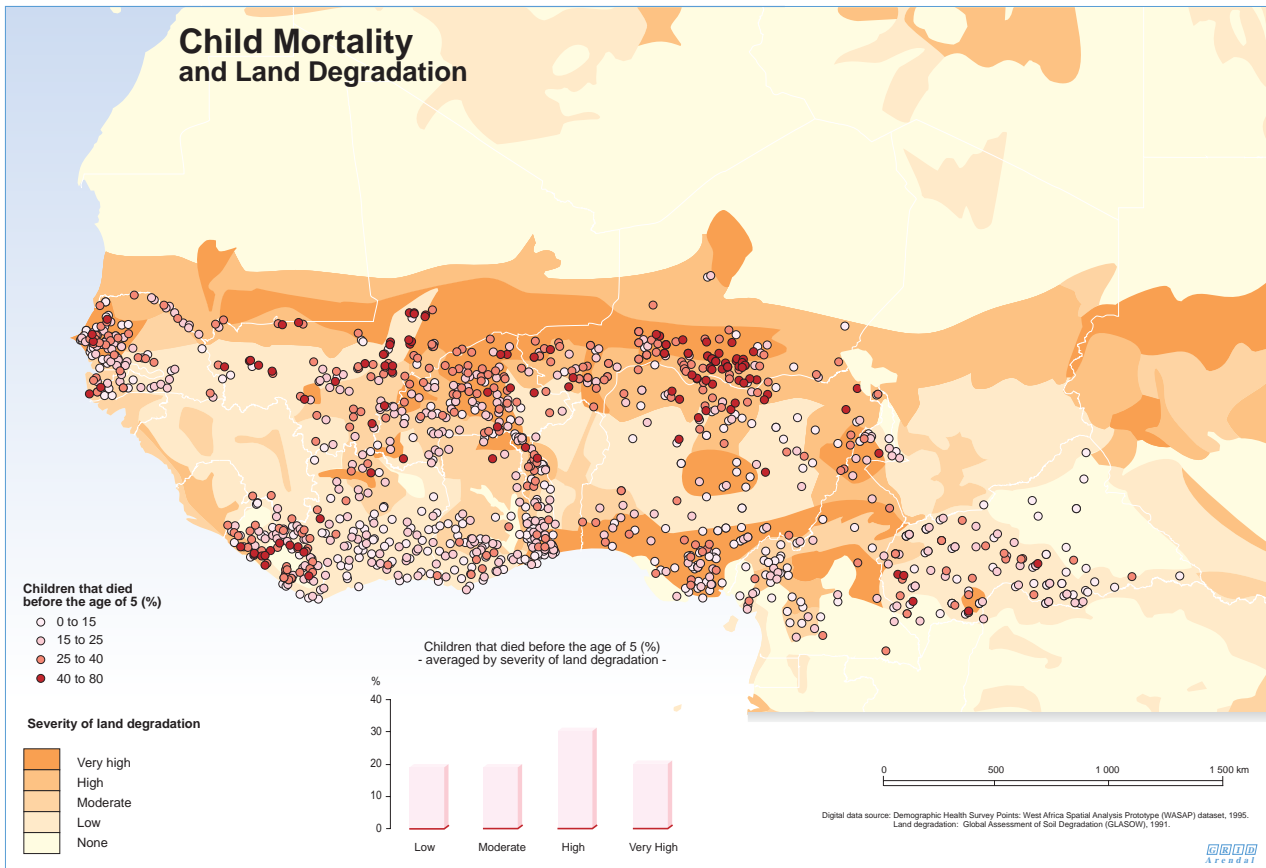
The main activity in this step is to map out the ecological system upon which the community depends for the 10 constituents of well-being. An integrated assessment of the three services the ecosystem provides will be conducted.

### STAGE 3 – POVERTY-ECOSYSTEM MAPPING

In Step 3, we overlay the poverty maps and the ecosystem resource maps to identify hot spots that need attention. Maps like the one shown in Figure 7 could be produced to illustrate visually the links between ecosystem services and various constituents of well-being.



**FIGURE 6.** Steps for operationalizing the conceptual framework.



**FIGURE 7.** A map showing the link between children stunted and land degradation in West Africa. Reproduced with permission from UNEP/GRID-Arendal.

*Information has been obtained from sources believed to be reliable and to provide the best available information at any given time. However, its accuracy and completeness, and the opinions based thereon, are not guaranteed. As every effort is made to provide accurate information in this database, UNEP/GRID-Arendal would appreciate if users of this data will call to our attention any errors that may occur by communicating with UNEP/GRID-Arendal (grid@grida.no; Longum Park, P.O. Box 1602, Myrene, N-4801 Arendal, Norway).*

## The UNEP Poverty-Ecosystem Process

### STAGE 4 – THE POVERTY-ECOSYSTEM INTEGRATED ASSESSMENT ANALYSIS

- a. The main activity in Stage 4 involves identifying the primary drivers for the environmental changes and the effects these changes have on the poor. The information for this activity will come from the participatory poverty assessment we would have carried out earlier. The participatory process should also involve the poor in soliciting their recommendations, especially those associated with instruments, institutional and organizational changes.
- b. The next step is to compute an analysis of trade-offs or synergies among the three services provided by ecosystems and the various constituents of well-being.
- c. The next step will involve the formulation of responses with respect to instruments, institutions and organizations with the primary objective of ensuring that the constituents are provided by the ecosystem.
- d. The last step in this stage will be the compilation of appropriate indicators that will provide information on the success of the policy interventions.

### STAGE 5 – INTEGRATION INTO LOCAL, REGIONAL AND NATIONAL POLICY FRAMEWORKS

- a. The first activity in Stage 5 is to evaluate and appropriate the funds needed for implementing the recommendations. This involves a budget appropriation process.

- b. Next, decisions will need to be made on what flows can be financed by the public sector and those that need to be supported by the private sector and the international community.
- c. The expenditure items to be undertaken by the public sector will need to go through the necessary budget process. The degree of external funding and donor aid will be determined at this point. Many of the recommendations related to participative freedom, social opportunities, economic opportunities, transparency guarantees and ecological security may need to be financed with public funds.



IFAD / H. Wagner

## The Way Forward and Challenges

**CURRENT** initiatives on addressing the poverty–environment link focus on the provisioning constituent—the *provisioning of goods for economic uses*—of ecological systems and identifying ways and means by which the poor can have access to this factor. However, provisioning is only one component of ecological systems.

We have shown that there is a strong need for incorporating the regulating and enriching constituents—the *life-supporting services*—of ecological systems into poverty reduction strategies of developing countries. The services provided by these two components are indispensable for the poor. The impoverished need these services to meet the elementary functionalities—*adequate nourishment, clean water, clean air, avoiding disease*—they require to enhance their capabilities to achieve the well-being they desire. If they are not able to get these from the ecological systems, they will then need to pay for these services at disproportionately higher prices than the “better off” in society, in most cases.

The conceptual framework presented in this paper attempts to incorporate the enriching and regulating constituents of ecological systems into poverty reduction strategies. We achieve this by framing the access to the services provided by regulation and enriching as a fundamental freedom that is used instrumentally by individuals to increase their capabilities to achieve the well-being they value. This is in contrast to the provisioning component, which is treated as a “capital.”

In this manner, we take life-supporting constituents of ecological systems out of the realm of the market and instead make an argument that they should be provided as an instrument of freedom to be used in an instrumental manner to enhance the capability of the poor.

We make a case for allowing the poor to take stewardship of the enriching and regulating constituents of ecosystems. But we also stress that stewardship by the poor will not automatically imply sustainable use of the ecological systems. There will be a strong need for institutions—the *rules of society*—that govern and monitor the use of ecological systems to ensure that these two constituents are sustainably managed. And these institutions need to evolve from an

open, transparent and participatory process whereby the poor or disenfranchised have active involvement.

The well-being of present and future human populations depends on ecologically sustainable and socially equitable ways of living. Ecosystems adapt and evolve with changes. However, humans are vulnerable, especially during times when ecosystem productivity drops. In order to reduce vulnerability and increase resiliency of the poor we need to:

- 1] **Move away from a one-size-fits-all approach and move toward a more suitable adaptive intervention strategy that embraces, understands and respects the complexity of ecosystems.**
- 2] **Intervention strategies need to work within the dynamics of the ecosystems, not “fight” against them. This means not trying to increase one ecosystem’s productivity to match other high-yield systems through technologies that are suitable for other ecosystems.**



### Exploring the Links



IFAD / S. Nimeh



## The Way Forward and Challenges

- 3] Intervention strategies need to take into account the temporal dynamics underlying ecosystems. Mobility of people and flexibility of tenure systems may be necessary to accommodate these regular seasonal changes.
- 4] Intervention strategies must be designed that respect the different degrees and types of use of ecosystem services to ensure that no stakeholder groups are marginalized in the process. Recognizing that different stakeholders use ecosystem services in different ways and have different degrees of dependency on these services is critical. Some may have clear substitutes while others have limited options.
- 5] The focus must not only be on improving human well-being in terms of material wealth, this will have only limited success. Moreover, there can be a tendency for this to work for a minority who have access to the provisioning services provided by ecosystems but does not work while the majority are excluded from these provisioning and regulating services. This majority suffers the most when ecosystem services are depleted and when productivity falls during times of ecological stress.
- 6] These challenges are exacerbated by the diversity, variability and transitions that occur to characterize ecosystems. To help meet these challenges, an ecosystem management paradigm that considers how human use of an ecosystem can maintain both its functioning and productivity is needed (Gunderson et al., 2002).
- 7] Combined with the above described efforts, attempts should be made to ensure policy coherence among and between policies at all levels.

In determining how to achieve all of the above, value judgments have to be made concerning equity and ecosystem stewardship. Toward these ends, and toward the reduction of poverty, an essential step is to better understand the ways in which human activities and well-being are related to ecosystem changes and services. Such an understanding and depth of knowledge will always be needed to inform and support responsible and forward-looking governance.



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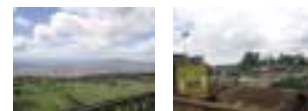
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**Exploring the Links**

## Epilogue

**THE** links between poverty and the environment are clear. They are real and significant—especially for the poor. The fact that the poor depend on the provisioning, regulating and enriching services ecosystems provide is unquestionable. We also know that compared to the rich, poor people are less able to access substitutes for these services. But this is only true in the short run. In the long run, we all depend on a sustainable flow of ecosystem services for our existence. It is therefore imperative that we make all efforts to curb the rapid decline in ecosystem services in the short term, which will go a long way towards reducing poverty in the long term and towards increasing human well-being for all individuals—rich and poor.

The immediate challenge we face is how to ensure that the poor can get access to ecosystem services and be able to use them in a sustainable manner. Recent empirical evidence highlights the many shortcomings of a purely market-driven approach. We cannot really expect developing countries to use environmental taxes to reduce environmental degradation when the tax system is often inefficient. We should also respect the informal laws that have been used for generations to oversee the sustainable use of ecosystem services and not undermine these rules of conduct with the introduction of formal laws that many communities find difficult to understand and even more difficult to use. The solution calls for more innovative ways that use a combination of market and non-market instruments implemented by partnerships among public, private and civil society sectors and supported by a mix of formal and informal institutions.

This conceptual framework provides a basis for responses and intervention strategies by various stakeholders towards the sustainable management of ecosystems and ecosystem services. The conceptual framework further highlights options and ways to better capture key environmental concerns in countries' development strategies—including poverty reduction strategies—as a way to respond to some of the challenges outlined in the Millennium Development Goals.



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Exploring the Links sets out to achieve three objectives: (1) to demonstrate how human well-being is dependent on ecosystems and ecosystem services; (2) to identify barriers and drivers that prevent the poor from using these ecosystem services to improve their well-being, in essence perpetuating poverty; and (3) to identify policy response options to remove the barriers, re-design or even introduce new intervention strategies to allow the poor to improve their well-being through an ecosystem approach.



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