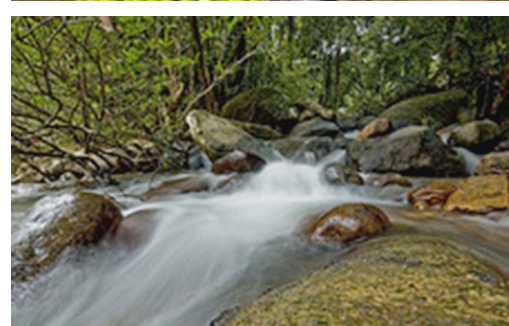
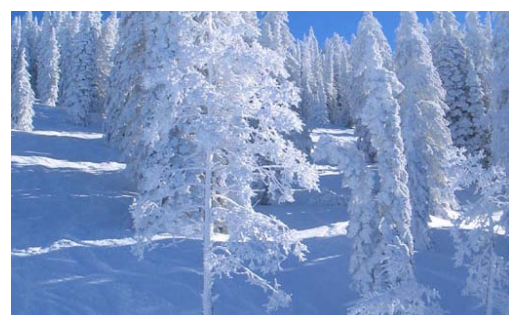


A GOOD PRACTICE GUIDE

ECOSYSTEM GOODS AND SERVICES IN DEVELOPMENT PLANNING



Convention on
Biological Diversity



2010 International Year of Biodiversity

The Convention on Biological Diversity (CBD) is a global agreement that addresses biodiversity. It was established in 1992, and has 193 Parties today, with three main objectives:

1. the conservation of biodiversity;
2. the sustainable use of its components; and
3. fair and equitable sharing of benefits arising out of the utilization of genetic resources.

The Secretariat of the CBD (SCBD) was established to support the goals of the Convention. Its principle functions are to prepare and service meetings of the Conferences of the Parties (COP) and other subsidiary bodies of the Convention, support Parties as appropriate, and coordinate with other relevant international bodies. The SCBD established the Biodiversity for Development Unit in 2008 with the support of the French and German governments. The goal of the Unit is to promote the integration of biodiversity conservation and poverty reduction objectives in both conservation planning (e.g. National Biodiversity Strategies and Action Plans) and development planning (e.g. Poverty Reduction Strategy Papers or Sustainable Development Strategies).

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Foreword to the series



The conservation and sustainable use of biological diversity and the eradication of extreme poverty are two of the main global challenges of our time. It has been recognized by the international community that these two challenges are intimately connected, and require a coordinated response. The protection of biodiversity is essential in the fight to reduce poverty and achieve sustainable development. 70% of the world's poor live in rural areas and depend directly on biodiversity and local ecosystems for their survival and well-being. The impact of environmental degradation is most severe for people living in poverty, because they have few livelihood options to fall back on.

The Millennium Development Goals (MDGs) were established by the United Nations in 2000 to combat poverty, hunger, disease, illiteracy, gender inequality and environmental degradation. They integrate the 2010 Biodiversity Target set in 2002 by the Convention on Biological Diversity to achieve, by 2010, a significant reduction in the rate of biodiversity loss. Biodiversity contributes directly to the availability of ecosystem goods and services and is key to the achievement of all MDG goals, and the fulfillment of this international commitment by 2015.

Building bridges between biodiversity, poverty reduction and development is a crucial task. It can be achieved by factoring the role, use and availability of ecosystem goods and services in development planning and decision making. It involves strengthening the capacity of decision makers in capturing the benefits and limits of ecosystems and transforming them in concrete actions towards securing the rights of the poor over resources while maintaining a balanced and sustainable use of ecosystems. This can be done by working with nature. It is for instance achieved by enhancing the integration of several sectoral plans into one multi-sectoral development strategy using the environment as a common denominator and by developing financial incentive measures based on the assessment of the role and valuation of ecosystem goods and services. It also includes strengthening partnerships and collaboration between biodiversity and development sectors putting in place pro-active environmental measures that can contribute directly to sustainable development for current and future generations.

This series of guides aims to compile good practices that support biodiversity conservation and poverty reduction in a number of different development sectors. It is our hope that these guides provide practical direction for governments, development agencies, businesses, and non-governmental organisations working to ensure that biodiversity conservation and poverty reduction activities go hand in hand.

Ahmed Djoghlaif, *Executive Secretary*
Convention on Biological Diversity

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Good Practice Guide Overview and Contents

The aim of the Good Practice Guide (GPG) is to provide a better understanding about the role of the environment and how development policies and budget processes can effectively internalize environmental priorities and benefits. This product, which is primarily directed at officers from finance and planning ministries, will also be of value to individuals from other sector ministries, government institutions, development and environmental groups. Following an overview of what environmental systems are, the GPG offers a variety of environmentally friendly approaches and mainstreaming measures for sustainable resource management and green income generation. By adding an environmental lens to planning, it introduces systemic approaches, market and non-market based environmental valuation and integration methods complementing existing economic criteria, and methods leading to the development of greener poverty reduction strategies, national development plans and sectoral plans. As environmental considerations contribute directly and indirectly towards securing economic sustainability, while reducing poverty and vulnerability to natural threats, a sound understanding of these dimensions will inevitably help effectively achieve national and global development objectives.

The current Good Practice Guide is designed to be read as much as possible in a non-linear way.

CD Contents

For readers interested in further resources, the CD will provide a presentation and additional material linked to the suggested tools and approaches found in the GPG. The information found in the CD complements the booklet by offering additional examples, tools and approaches to help underpin the positive role played by the environment in planning processes.

Policy experts will benefit through this Good Practice Guide by:

- Enhancing their understanding about the environmental links to sector policies;
- Factoring environmental benefits within development policies and plans;
- Developing pro-poor policies based on environmentally friendly practices;
- Learning about how environmental benefits can help alleviate poverty and contribute towards sustainable development;
- Engaging in mechanisms to build active dialogues with stakeholders around environmental issues;
- Strengthening the environmental efficiency and effectiveness of their strategies through better coordination between line ministries;
- Providing better planning processes in consultation with environmental stakeholders;
- Enhancing current environmental monitoring practices and experience sharing;
- Introducing environmental assessment and valuation approaches built around environmental goods and services;
- Efficiently integrating environmental objectives to meet donor requirements;
- Developing environmentally-based strategic thinking.

Financial experts will benefit through this Good Practice Guide by:

- Exploring new revenue options available through environmental services;
- Identifying recurrent sources of environmental revenue;
- Developing knowledge about environmental valuation approaches and tools;
- Reinforcing budget processes through better accountability and structure;
- Introducing mechanisms to identify and avoid perverse incentives while allocating more attention to sustainable environmental investments;
- Increasing opportunities to access development assistance through sound and transparent budgeting.

Environmental and concerned practitioners will benefit through this Good Practice Guide by:

- Identifying and participating in budget and planning mechanisms to mainstream ecosystem contributions to sector development;
- Developing new capacity of environmental programme development to harmonize environmental benefits within other sector plans;
- Building stronger cooperation and joint initiatives with other ministries;
- Using the guide as a tool for environmental awareness;
- Strengthening understanding about the role of the environment through economic arguments and the introduction of new approaches;
- Accessing new environmental funding mechanisms.

Notes

The use of certain designations have been limited for practicality:

- Environment Ministry: Can be a substitute, when applicable, for Environmental Departments, Agencies, Ministries of natural resources;
- Planning Ministry and Finance Ministry: Can be separate agencies or sometimes are combined under the same umbrella. In the current Guide they are shown as two separate entities;
- Developing countries refers to: Low income countries, small islands developing states and can include mid-income countries;
- Vulnerable Groups: can include women, older people, children and Indigenous People (when appropriate).

Acronyms

CHM	Clearing-House Mechanism
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EFR	Environmental Fiscal Reform
EGS	Ecosystem Goods and Services
FAO	Food and Agriculture Organization of the United Nations
GBS	General Budget Support
GHG	Greenhouse Gases
GPG	Good Practice Guide
ICCAs	Indigenous and Community Conserved Areas
LDCs	Least Developed Countries
MA	Millennium Ecosystem Assessment
MDGs	Millennium Development Goals
MEAs	Multilateral Environmental Agreements
MTEF	Medium Term Expenditure Frameworks
NBSAPs	National Biodiversity Strategies and Action Plans
NSDS	National Sustainable Development Strategies
PAF	Performance Assessment Framework
PEEM	Public Environmental Expenditure Management
PEER	Public environmental expenditure reviews
PERs	Public Expenditure Reviews
PES	Payments for Ecosystem Services
PRSPs	Poverty Reduction Strategy Papers
REDD/REDD+	Reduced Emissions from Deforestation and Forest Degradation
SEA	Strategic Environmental Assessment
SIDS	Small Island Developing States
SNA	Standard National Accounts
SWAps	Sectorwide approaches
SWG	Sector Working Groups
TEEB	The Economics of Ecosystems and Biodiversity

COP9

“Society must urgently replace its defective economic compass so that it does not jeopardize human well-being and planetary health through the under-valuation and consequent loss of ecosystems and biodiversity.”

—Pavan Sukhdev, TEEB Study Leader, CBD COP 9



1 Demystifying the Environmental Jargon

1.1 Environmental Language Barriers

Strategies of future development can be effectively drafted taking more proactive consideration of the environmental dimension. Up to now, development has been mostly linked to a vision of rapid economic benefits, a perception that excluded the full role of environmental systems and the capacity of resources to replenish. A new form of planning is needed to avoid a sudden collapse of environmental systems leading to irreversible consequences. Today's examples of natural threats to the stability of socio-economic systems affect countries locally and globally. Climate change, for example, is increasingly becoming a priority issue leading to impacts such as increased natural disasters, conflicts, economic pressures, health hazards and food insecurity. Consequently, a new generation of development policies built around a sound understanding of the use, thresholds and the full role of environmental systems can help secure human well-being and socio-economic sustainability. But, an effective switch to greener planning has often been hostage to poor communication between the scientific community and decision makers. Many language barriers, coupled with inherent uncertainty in our understanding of natural system dynamics, make environmental jargon appear too technical to other experts outside the conservation field. Lack of understanding of many environmental theories and concepts force experts involved in drafting development policies and budgets to fall back on more familiar socio-economic approaches. To effectively link environmental goals to pro-poor and sustainable development objectives, it is important to render the scientific content of any environmental message practical and accessible by demystifying some of the existing jargon barriers and scientific uncertainties. The following section gives a brief overview of some of the environmental concepts that characterize the common language of environmental practitioners. Some of the terms will appear regularly in this document and in the attached CD. Their understanding will assist in the reading of the Good Practice Guide (GPG).

1.2 Biodiversity and Ecosystems: an Overview

Biological diversity or biodiversity is the term commonly used to refer to the diversity of life on this planet. Nature diversity and systems provide the conditions and drive the processes that sustain the economy – and our very survival. Maintaining the diversity of life on Earth is not merely about saving charismatic species or an ethical responsibility that humans have towards nature. This diversity is the essential contributor to all life forms. Under the Convention on Biological Diversity, *Biological diversity refers to the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part.*

Human beings are part of this biodiversity and they interact directly with all of its elements. This interaction happens at different geographical and temporal scales. Natural systems or ecosystems where this interaction takes place represent the main tissue, providing vital and complex benefits needed for our survival, and human needs. In the word ecosystem, Eco - comes from the Greek oikos which means house or 'habitat'. Ecosystem can be understood as a reference to our own house as humans.

Ecosystems contain complex relationships between living organisms (biodiversity) and non-living matter as well as the weather patterns that affect them. They are found in a state of dynamic equilibrium, to which development activities can cause irreversible damages. Ecosystems are being intensely degraded, utilized, fragmented and transformed throughout the world into less diverse production landscapes, often without a thorough understanding of their role and benefits to development. Ecosystems are closely linked to social systems allowing some to refer to *coupled socio-ecological systems* (Duraiappah *et al.* 2008). For example, 1.3 billion human beings draw their livelihoods from live from forest resources, 70% of world population relies on medicinal plants, and the livelihoods of more than 3 billion people depend on marine and coastal biodiversity. We all depend on biodiversity and ecosystems in different ways and to different extents. But a significant part of the world's population living in rural areas (especially in developing countries) depends heavily on what local ecosystems can provide. For instance agrobiodiversity refers to the type of biodiversity required in the production of food and agriculture. It is one of the main bases of food security. The importance played by agrobiodiversity is illustrated in box 1 below:

Box 1: *The Role of Agro-biodiversity*

Experience and research have shown that agrobiodiversity can:

- Increase productivity, food security and economic returns;
- Reduce the pressure of agriculture on fragile areas, forests and endangered species;
- Make farming systems more stable, robust and sustainable;
- Contribute to sound pest and disease management;
- Conserve soil and increase natural soil fertility and health;
- Contribute to sustainable intensification;
- Diversify products and income opportunities;
- Reduce or spread risks to individuals and nations;
- Help maximize effective use of resources and the environment;
- Reduce dependency on external inputs;
- Improve human nutrition and provide sources of medicines and vitamins;
- Conserve ecosystem structure and stability of species diversity.

Source: FAO 2004

1.3 Human Impacts on Biodiversity and Ecosystems

Biodiversity loss and the degradation of ecosystems are associated with unsustainable human development activities such as intensive agriculture, forest exploitation, industrial production, as well as other socio-economic needs and ambitions which transform habitats extensively. From a historical dimension this degradation process started with agricultural practices replacing the living habits of hunter/gatherer societies. As new cities were built, they expanded pressuring agricultural lands and their capacities to sustain dependent populations. This desire for continuous expansion suffered from a limited knowledge of the risks involved in intensive agricultural practices and led centuries ago to the fall of many great civilizations, as demonstrated in box 2.

In ancient times impacts were geographically isolated from each other, but today environmental impacts are becoming globally threatening, and intensive development affects all environmental systems. Following the agricultural revolution, the era of the industrial revolution has considerably affected the global environmental equilibrium. Since the middle part of the twentieth century this trend has seen a drastic turn towards extensive and unsustainable exploitation of natural resources. Today, *the economic accelerator needs its environmental fuel, but at the same time its environmental brakes, in order to survive*. The environmental footprint of human activities since the 1950s has been much greater than the environmental impact of combined natural and human-made actions since the early history of humanity. Environmental degradation, such as desertification leading to shrinking lakes, dried up rivers and disappearing forests, constitutes an invisible barrier to future development activities.

The fragmentation and deterioration of habitat have accelerated the historical rate of loss of biodiversity by a magnitude of 100 times more than what is attributed to natural phenomena (UNEP 2007), with this figure potentially increasing to 1,000 or 10,000 times (MA 2005) over the coming decades. Biodiversity and its current and potential benefits continue being lost at alarming rates with an estimated 20,000 living organisms disappearing forever every year, most being unknown to science (IUCN n.d.). With climate change, this figure will climb even higher. This abnormal rate of loss is leaving only a very slim chance for all life forms to adapt, the result of which is a net loss of biodiversity (see box 3) and ecosystem resilience.

Box 2: Collapse of Civilization and Environmental Degradation

One of the disturbing facts of history is that so many civilizations collapse. Few people, however, least of all our politicians, realize that a primary cause of the collapse of those societies has been the destruction of the environmental resources on which they depended. Fewer still appreciate that many of those civilizations share a history of sharp and rapid decline. Indeed, a society's demise may begin only a decade or two after it reaches its peak population, wealth, and power.

Recent archaeological discoveries have revealed similar courses of collapse in such otherwise dissimilar ancient societies such as the Maya in the Yucatán, the Anasazi in the American Southwest, the Cahokia mound builders outside St. Louis, the Greenland Norse, the statue builders of Easter Island, ancient Mesopotamia in the Fertile Crescent, Great Zimbabwe in Africa, and Angkor Wat in Cambodia. These civilizations, and many others, succumbed to various combinations of environmental degradation and climate change, aggression from enemies, and declining trade with neighbors who faced their own environmental problems. Because peak population, wealth, resource consumption, and waste production are accompanied by peak environmental impact — approaching the limit at which impact outstrips resources — we can now understand why declines of societies tend to follow swiftly on their peaks.

Source: Diamond 2005

Box 3: Biodiversity Loss and Environmental Pressures

A number of statistics indicate the seriousness of the situation:

- Half of the world's wetlands have been lost in the past century;
- 80% of grasslands are suffering from soil degradation;
- 20% of dry lands are in the danger of becoming deserts;
- Current atmospheric emissions of CO₂ are nearly four times the total emissions in 1950;
- The tropical forest estate is shrinking at about 5% per decade, adding 3 billion tons of CO₂ to the atmosphere each year and contributing to major loss of biodiversity;
- A new global study concludes that 90% of all large fishes have disappeared from the world's oceans in the past half century, the devastating result of industrial fishing;
- About 20 to 120 million people live in areas affected by desertification;
- Inland water species have declined by 50%;
- Marine and terrestrial species have declined by approximately 30%;
- 23% of mammals and 25% of conifers are currently threatened with extinction;
- The status of bird species has deteriorated over the last two decades with 12% now threatened with extinction;
- 32% of amphibians are categorized as threatened with extinction.

Source : World Bank 2008/ Worm, Lotze and Myers 2003/ JLG 2007/SCBD 2006



Box 4: Philippines — *Muyong System*

The inhabitants of Ifugao, in the Philippines, have developed a unique way of life, reflected in the way they grow and tend forests. This unique system of tending forests has been referred to in the literature as the “*muyong system*,” coined from the local dialect meaning forest or woodlot. The *muyong system* has been recognized internationally as an ideal forest management strategy that is deeply ingrained in the culture of the Ifugao people.

The *muyong system* can be viewed from different perspectives, either as a forest conservation strategy, a watershed rehabilitation technique, a farming system or an assisted natural regeneration (ANR) strategy. While the system can be viewed from different perspectives, the role of culture in the development and continued maintenance of the system is pervasive. Although not readily apparent to the casual observer, an intricate web of relationships exists between the human and non-human resources of the system, which move to a higher sphere in the spirit world (Ngidlo, 1998). Ifugao culture and laws revolve around their physical environment, expressed in customs and taboos prescribing the treatment and use of environment and natural resources.

Source: Dugan *et al.* 2003

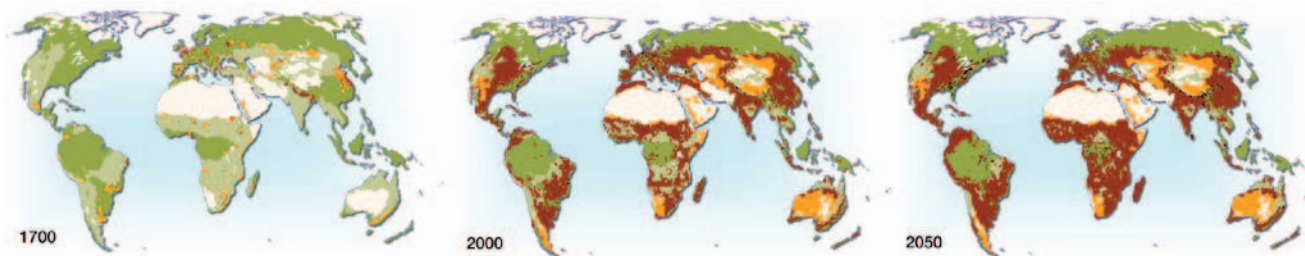
The socio-economic consequences of such losses to many human communities are substantial and often irreversible. However, parallel to negative impacts resulting from unsustainable practices, there are situations where human communities have managed to live in *respect* with the environment, developing an eco-friendly vision and use of nature. This knowledge is tightly interwoven with traditional religious beliefs, land-use practices and community-level decision-making processes. One example is the case of traditional communities such as the Ifugao in the Philippines. The Ifugao as well as many other indigenous people have succeeded to live for centuries in equilibrium with nature developing sustainable agricultural practices (see box 4).

Traditional knowledge refers to the knowledge, innovations and practices of indigenous and local communities around the world. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is transmitted orally from generation to generation and tends to be collectively owned. Traditional knowledge is mainly of a practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, forestry and environmental management in general. There is today a growing appreciation of the value of traditional knowledge. This knowledge is valuable not only to those who depend on it in their daily lives, but to modern industry and agriculture as well. Many widely used products, such as plant-based medicines, health products and cosmetics are derived from traditional knowledge. Other valuable products based on traditional knowledge include agricultural and non-wood forest products as well as handicrafts.

Traditional knowledge can also make a significant contribution to sustainable development and in addressing many of the global issues currently facing humanity.

1.4 Biodiversity and Associated Ecosystem Goods and Services

The condition of human health, the availability of food and water, cultural inspiration and traditions, protection from natural hazards and many other socio-economic dimensions, are directly shaped and dependent on the



A central component in preventing loss of biodiversity and ecosystem services, such as provisioning of water, from expanding agricultural production is to limit the trade-off between economic growth and biodiversity by stimulating agricultural productivity and more efficient land use. Further enhancement of agricultural productivity (‘closing the yield gap’) is the key factor in reducing the need for land and, consequently, the rate of biodiversity loss. This option should be implemented carefully in order to not cause additional undesired effects, such as emissions of excess nutrients and pesticides and land degradation. An increase in protected areas and change towards more eco-agricultural cropping systems and sustainable meat production could have immediate positive effects on both biodiversity and water resource management, while increasing revenues from tourism.

Landuse and agriculture

- Agricultural land
- Extensive grasslands (incl pasture)
- Regrowth after use
- Forests
- Grasslands
- Non-productive land

Source: UNEP/GRID-Arendal 2009a

Figure 1: Land use and Agriculture

type and state of ecosystems. A practical and utilitarian way of referring to the contribution of biodiversity and ecosystems to human needs is through the concept of Ecosystem Goods and Services (EGS). Ecosystem goods and services can contribute to humans’ daily requirements either through their direct contact with nature or in the form of transformed or repackaged goods and services (e.g. bottled water, packaged food, herbal medication, energy, etc.). Conversely, decisions about human development activities can impact positively or negatively on all of the vital functions of ecosystems and their use. In many cases these decisions will also determine the type and level of accessibility of human communities to the needed EGS. It is this level of accessibility which can often differentiate poor and vulnerable groups from others with a secure and broad access to EGS.

The cycle of life relies directly on existing biodiversity and resulting ecosystem services that support and regulate natural cycles (e.g. flow of water, decomposition of matter, reproduction of species, etc.) and atmospheric conditions. Diverse ecosystems represent the means to sustainably meet current economic and social needs.

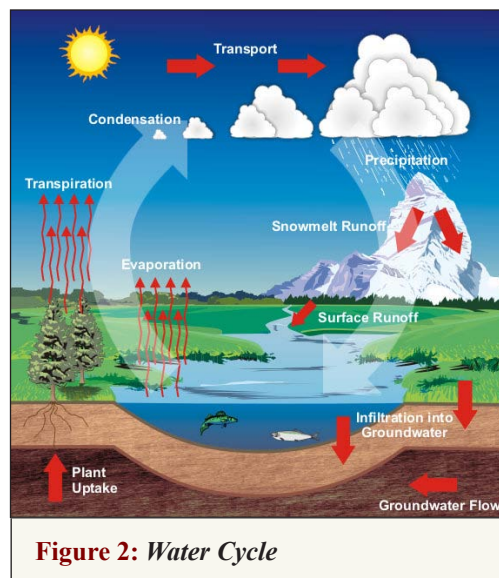


Figure 2: Water Cycle

Source: (NOAA n.d.)

Human development impacts on available EGS and the rapidly changing (and in many cases deteriorating) state of our ecosystems have been captured in the Millennium Ecosystem Assessment (MA) Report in 2005, which involved the work of more than 1300 experts and close to 4 years of work. In the MA study, twenty four specific “services” of importance to human society were identified, and assessed according to four categories:

- provisioning services
- supporting services
- regulating services
- cultural services

Within the MA fifteen out of twenty-four ecosystem services are listed as being under some kind of pressure as shown in Table 1 below. This highlights the need for improved planning processes capable of internalizing environmental dimensions effectively. As ecosystem dynamics and benefits are still being researched, studies are underway to help capture EGS monetary and non-monetary benefits.

Goods and services provided by biodiversity have significant economic value, even if some of these goods and most of the services are not traded by the market. The value of biodiversity-dependent goods and services is difficult to quantify and

Table 1: State of ecosystem services			
Ecosystem Services	Degraded	Mixed	Enhanced
Provisioning	Capture fisheries Wild food Wood fuel Genetic resources Biochemicals Fresh water	Timber Fiber	Crops livestock aquaculture
Regulating	Air quality regulation Regional and local Climate regulation Erosion regulation Water purification Pest regulation Pollination Natural hazard regulation	Water regulation (e.g. flood protection) Disease regulation	Carbon sequestration*
Cultural	Spiritual and religious values Aesthetic values	Recreation and ecotourism	

Source: Adapted from Ranganathan, Irwin and Repinski 2009

* Carbon sequestration has recently been enhanced globally, due in part to the regrowth of forests in temperate regions, although previously deforestation had been a net source of carbon dioxide emissions.

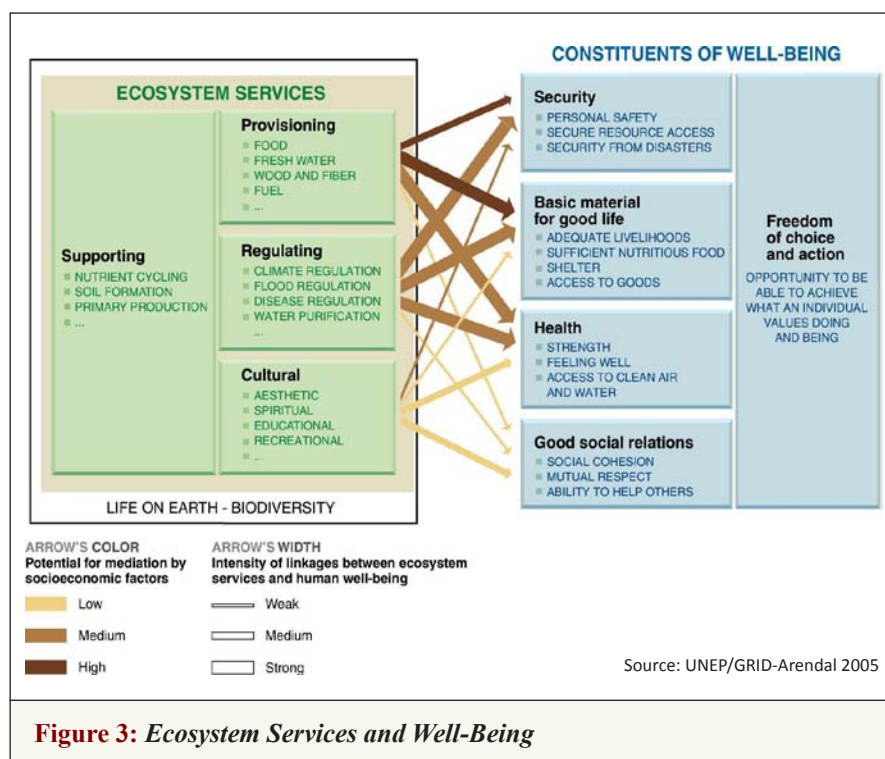


Figure 3: Ecosystem Services and Well-Being

may depend on the interests of stakeholder groups. Ecosystem services may be worth trillions of dollars annually (Costanza *et al.* 1997), but most of these services are not traded in markets and carry no price tags to alert society to changes in their supply, or even their loss. The sustained use and access to biodiversity-derived goods is provided to society at low costs. An estimated 40% of the global economy is directly based on biological products and processes, and the goods provided by biodiversity represent an important part of many national economies. The monetary valuation of EGS is attracting more attention as a mechanism to guide decision makers. This led the EU in 2008 to fund a study entitled *The Economics of Ecosystems and Biodiversity* (TEEB). One example among many mentioned in the TEEB initiative reports global yearly losses of forest ecosystem services as ranging between US\$ 2 to 5 trillion (EU 2008). In light of climate change impacts, a 2009 IIED study entitled *Assessing the costs of adaptation to climate change: a review of the UNFCCC and other recent estimates* evaluates the net present value of climate change in absence of adaptation measures at 1240 trillion\$. Unfortunately, much of these financial benefits remain unaccounted for in planning and decision making. In light of such alarming figures and findings, and taking into consideration development challenges (poverty, resource depletion, natural hazards, diseases, etc.) sound environmental policies and actions for mitigating current ecosystem degradation are necessary and urgent.

1.5 Tangible and Non-tangible Ecosystem Goods and Services

In making development policy choices, it becomes essential to look holistically at ecosystem services as they are complementary and inter-linked and their benefits cannot be separated from each other. A negative impact on one ecosystem service can result in an amplified series of repercussions on the availability of other services. For example, the sustainable management of forests can reduce the risk of erosion, increase the availability of water, reduce the impact of floods, and secure access to medicinal plants while providing hunting grounds for local and indigenous communities. Thus, the loss of one benefit will often mean the loss of many others drawn from the same ecosystem.

Benefits from ecosystems exist in tangible (mainly provisioning) and non-tangible forms (supporting, regulating and cultural). Tangible services (e.g. provision of food, fresh water, etc.) can be more easily understood, roughly measured and valued with traditional economic and scientific methods. Conversely, understanding the importance of non-tangible types can be harder to capture. This element of complexity means that non-tangible services are poorly valued using common economic tools and knowledge. Ecosystems' contribution to economic activity relies on both its share of tangible and non-tangible benefits. Natural capital is particularly important to developing countries. It accounts for an estimated 26% of total wealth in low income countries and 13% of middle income countries and only 2% of wealth in industrialized countries (OECD 2009). But accurate accounting of the full array of environmental benefits should reflect the tangible and non-tangible role played by nature services. For instance, the 30 largest cities in the Baltic Sea drainage basin use 200 km² of terrestrial and aquatic ecosystems for every 1 km² of urban area to produce their agricultural, forestry, and fishery products (Ayers *et al.* 1996). Unfortunately, non-visible services are weakly accounted for in development strategies, the result of which is an accelerated degradation of ecosystems and depletion of resources with severe socio-economic costs.

1.6 Renewable and Non-renewable Ecosystem Goods and Services

Renewable resources are resources that are capable of being replaced by natural ecological cycles or sustainable management practices (e.g. solar energy, water, timber). Renewable resources are greatly dependent on the availability of appropriate sites or areas of land and their availability can vary according to time and seasons. Although, solar energy is present in an abundant supply, most renewable resources can be depleted (e.g. water, timber) or in certain cases become extinct (e.g. plants, animals).

A non-renewable resource is a resource that is concentrated or formed at a rate very much slower than its rate of consumption and so, for all practical purposes, is non-renewable (e.g. coal, petroleum and natural gas). Human actions can result in a decrease in the quality and/or quantity of resources if they are used or harvested at a rate faster than they can be renewed. When this occurs, it is said that people are living off their natural capital, rather than the interest of the natural capital (Bruce Mitchell 1999).

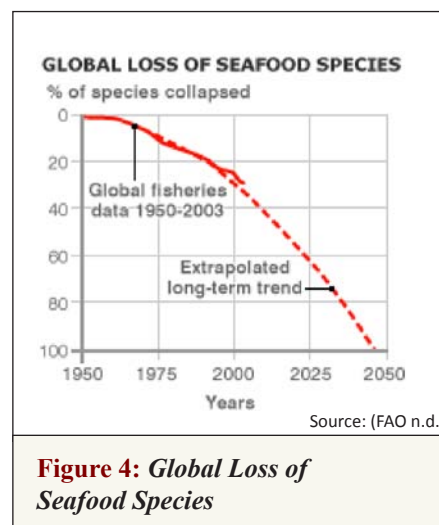


Figure 4: Global Loss of Seafood Species

For instance, mangroves are unique ecosystems. As a source of renewable resources, they are second to none in terms of its natural productivity and the wide range of goods and services they provide on a continuing basis. The economic potential of mangroves stems from three main sources, namely, forest products, estuarine and near-shore fisheries, and ecotourism. In addition, mangroves play a pivotal role in coastal protection and maintenance of habitats for a large range of common, threatened and endangered species.

Policy planning and decision making favoring rapid growth over sustainability has challenged the capacity of ecosystems to adjust and regenerate the desired goods and related services. Unsustainable activities leading to the depletion of certain goods can also result in the alteration and collapse of a particular ecosystem, an alteration of its functions, as well as loss of some or all goods and services associated with neighboring systems. Any sustainable measure should respect the limits of ecosystem resilience and regeneration of its constituents (e.g. soils, living species, water, etc.). Many countries have lost some vital ecosystem functions forever. For instance, Colombia once second in the world with freshwater reserves, has fallen to 24th as a result of extensive deforestation over the past 30 years. Excessive deforestation around the Malaysian capital of Kuala Lumpur, combined with dry conditions, triggered strict water rationing in 1998, and for the first time the city had to import water (Butler 2009). A recent study on global fisheries employing more than 50 years worth of fishery data, predicted that by 2048 the ocean would be empty of fish (Hance 2008). Adding an environmental lens to decision processes is important to avoid long term and irreversible impacts.





In the case of renewable resources, such as fisheries and many types of forests, where there is scope for continued exploitation at economically profitable levels, a decision to deplete and eventually liquidate the stock completely must be based on a careful calculation of all the associated costs and benefits. In addition to the opportunity cost of continued sustainable extraction, this calculation must factor in the wide range of environmental services provided by natural systems (e.g. including tangible and non-tangible ecosystem goods and services.). There will often be differing perceptions of trade-offs at the regional, national level and local levels. For example, a forest may provide essential services to a region in terms of watershed protection whereas local inhabitants would earn more by converting it to agriculture. Conversely, the conversion of a natural forest into a plantation may generate economic benefits and jobs but undermine the livelihoods of local communities. A detailed distributional analysis is needed to ensure that the poor are not left worse off after conversion than before, even when others gain (OECD 2009).

1.7 Human-Engineering Solutions and Ecosystem Based Solutions

Human-made technology is not always a substitute to nature's functions or necessarily the best solution to environmental issues. Planning for environmental sustainability could imply two broad categories of responses. The first category refers to measures mainly linked to human-made solutions needed to eliminate or mitigate the pollution and impacts of development activities. Examples include the treatment of wastewater, the installation of filtering systems and the incineration of waste. Human-made environmental infrastructure is built to deal with damage done to ecosystems and in some cases to enhance the availability of specific ecosystem services (e.g. water, energy.). The second category focuses on a *softer* and more proactive approach, whereby natural provisioning and regulating functions and services of ecosystems are recognized and supported. To regulate itself, nature relies on biological processes that have proven their effectiveness for thousands of years.

The capacity of nature to provide alternative options to those offered by human engineered responses, is showing increasing appeal (See Table 2).

Table 2: Human-Engineering Vs Nature Solutions	
Some Human-made Solutions	Equivalent Ecosystem Solutions
Waste water treatment plant	Wetlands
Coastal protection	Mangroves
Flood control systems	Sustainable Forest Management
Incineration/Landfills	Organic waste decomposition
Carbon Sequestration	Sustainable Forest Management

For instance, building waste-water treatment plants can entail expensive investments while equivalent ecosystem filtering functions have always existed for free and can be used to achieve the desired water filtering objectives (See box 5 and box 6).

Proactive environmental measures can replace (partially or fully) many of the otherwise expensive human-made solutions. But for this to be possible, knowledge about ecosystem benefits needs to be effectively captured within planning processes and articulated into green incentives and compensations. Some eco-friendly solutions are achieved at virtually no costs requiring simply the appropriate protection of biodiversity and sound ecosystem management (see Table 3).

By studying and emulating ecosystems and individual species (e.g. models, shapes, processes, etc.) discoveries are also being made and adapted to various human needs. For instance, biomimicry is an emerging field which dedicates itself to new research and findings inspired by nature and living organisms. In terms of biodiversity and its applied potential, the Earth's 10-30 million species, with time-tested genius, can potentially help meet many human sustainable objectives (The Biomimicry Institute). In this sense, nature can be regarded as a living treasure, its wealth more important than just the quick financial benefits generated from exploiting part of its goods and services and degrading the rest.

Box 5: Uganda – Water treatment and purification functions of the wetland

Whereas wetland resource utilization activities are carried out almost exclusively by the people who live in settlements which directly border Nakivubo, the benefits associated with water treatment and purification accrue over a much larger area, to urban residents and industries throughout Kampala. The wetland plays an extremely important role in maintaining the quality of the city's water supply. It physically, chemically and biologically removes pollutants and sediments from the wastewater which passes through it, and reduces the pollution load entering Inner Murchison Bay through mineralization and sedimentation processes. Of particular significance is the capacity of wetland plants to remove phosphorus and nitrogen and the accumulation of suspended solids; pollutants and pathogenic organisms in the wetland's bottom sediments are decomposed; heavy metals are converted from soluble to insoluble forms; and effluents are diluted by means of density currents that are caused by the difference in temperature between wetland and bay water.

Source: Emerton *et al.* 1998

Box 6: United States of America — Catskill Mountains

The Catskill Mountains provide 90% of the water to New York city and since the 1990s , have been under a payments for ecosystems services (PES) scheme to preserve drinking water quality. When it began, instead of investing US\$6-8 billion in a water filtration plant, the city’s authorities considered that investing in improving land use in the watershed was more cost-effective, requiring an investment of only US\$1.5 billion. Farms that opt to participate in the Watershed Agricultural Program receive technical assistance in designing a strategy for controlling potential sources of pollution on the farm, with New York City covering all costs associated with the implementation. Participating farms become eligible for other elements of the compensation package for specific environmental services.

Source: FAO-PESAL n.d.

Table 3: Comparison Between Pro-active and Responsive Approaches

Proactive Approach	Responsive Approach
<ul style="list-style-type: none"> ▪ Cheaper than mechanical solutions ▪ Maintains the ecological integrity of site ▪ Ecosystem management skills required 	<ul style="list-style-type: none"> ▪ Might be the only option available ▪ Can alter the functions and services of an ecosystem ▪ Costly and might involve recurring operational costs ▪ Requires access to technology

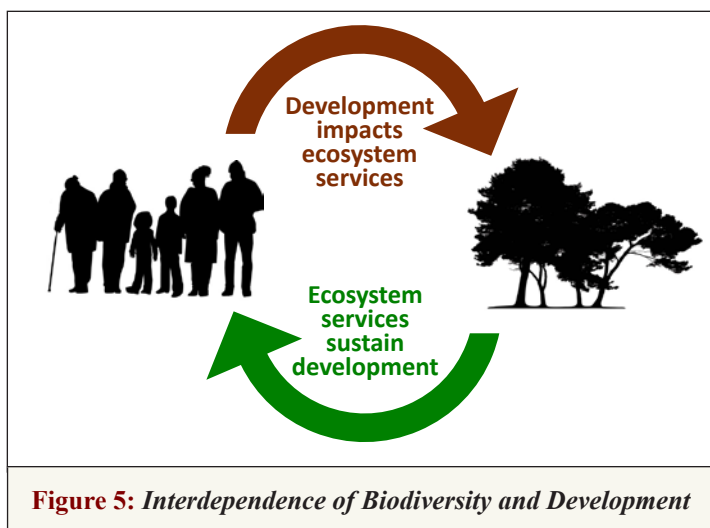


Figure 5: Interdependence of Biodiversity and Development



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SECTION 1 SUMMARY		
Concept/Issues Overview	Definition/Details	Some Facts/ Recommendations
Introducing pro-active thinking	<p>Development strategies are better built around pro-active environmental approaches rather than responsive ones.</p> <p>The Environment Ministry as a pro-active player, and not simply 'the green police', can contribute effectively towards economic development and poverty reduction.</p>	<ul style="list-style-type: none"> ▶ Close to 1.3 billion human beings earn a living from forest resources; ▶ 70% of world population relies on medicinal plants; ▶ The livelihoods of more than 3 billion people depend on marine and coastal biodiversity.
Biodiversity	Refers to the diversity of life on this planet.	<ul style="list-style-type: none"> ▶ Biodiversity its current and potential benefits continue being lost at an alarming rate, estimated at 20,000 living organisms disappearing forever every year. ▶ Inland water species have declined by 50%.
Ecosystem	<p>Ecosystems are made out of the complex relationships between living organisms (biodiversity) and non-living matter as well as the weather patterns that affect them.</p> <p>Ecosystem: Eco - comes from the Greek <i>oikos</i> which means house or 'habitat'. Ecosystem can be understood as a reference to our own house as humans.</p>	<ul style="list-style-type: none"> ▶ Marine species exploited for commercial purposes have been reduced by 90 % in much of the world since commercial fishing began; ▶ An estimated 40% of the global economy is directly based on biological products and processes; ▶ Half of the world's wetlands have been lost in the past century; ▶ 80 % of grasslands are suffering from soil degradation; ▶ 20 % of drylands are in the danger of becoming deserts.
Ecosystem Goods and Services	A practical and utilitarian way of referring to the contribution of biodiversity and ecosystems to human needs is through the concept of Ecosystem Goods and Services (EGS).	<ul style="list-style-type: none"> ▶ 15 out of 24 ecosystem services are listed as being under some kind of pressure. <p>24 specific ecosystem goods and services of importance to human society were identified, and assessed according to four categories:</p> <ul style="list-style-type: none"> ▪ Provisioning services; ▪ Regulating services; ▪ Supporting services; ▪ Cultural services.
Tangible and Non-tangible Ecosystem Goods and Services	<p>Benefits from ecosystems exist in tangible forms (mainly provisioning services such as food, water, raw materials, medicines, etc.) and non-tangible forms (supporting, regulating and cultural services).</p> <p>Ecosystems' contribution to economic activity relies on both tangible and non-tangible benefits.</p>	<ul style="list-style-type: none"> ▶ The net present value of climate change impacts in absence of adaptation measures is estimated at US\$ 1240 trillion; ▶ Yearly losses of forest ecosystem services range between US\$ 2 to 5 trillion. <p>Non-tangible services are weakly accounted for in development strategies.</p>
Renewable and Non-renewable Ecosystem Goods and Services	Policy planning and decision making favoring rapid growth over sustainability have challenged the capacity of ecosystems to adjust and regenerate the desired goods and related services.	<ul style="list-style-type: none"> ▶ The 30 largest cities in the Baltic Sea drainage basin use 200 km² of terrestrial and aquatic ecosystems for every 1 km² of urban area to produce their agricultural, forestry, and fishery products. <p>Policy measures should respect the limits of ecosystems resilience and regeneration of their constituents to avoid degradation or even collapse.</p>

SECTION 1 SUMMARY

Concept/Issues Overview	Definition/Details	Some Facts/ Recommendations
<p>Human-Engineering Solutions and Ecosystem Based Solutions</p>	<p>Planning for environmental sustainability could imply two broad categories of responses. The first category refers to measures mainly linked to human-made solutions needed to eliminate or mitigate the pollution and impacts of development activities. The second category focuses on a <i>softer</i> and more proactive approach, whereby natural provisioning and regulating functions and services of ecosystems are recognized and supported.</p>	<p>Wastewater treatment plants can entail expensive investments while equivalent ecosystem filtering functions have always existed for free and can be used to achieve some or all of the desired water filtering needs.</p> <p>Knowledge about ecosystem benefits is to be effectively captured within planning processes and articulated into green measures, incentives and compensations.</p>



Flickr.com/Molly Stevenson



2 Ecosystem Goods and Services in Sustainable Development

2.1 Ecosystem Goods and Services and Development Sectors

Ecosystems provide the resources and means both tangible and non-tangible to carry industrial processes and development activities (e.g. building roads, energy generation, etc.). Conversely, these activities when poorly integrated can generate negative impacts resulting in accelerated depletion of EGS and higher production costs. Ecosystems are not isolated entities, rather there are always interactions between them through the range of species which compose ecosystems the services they provide, other natural functions and events (e.g. storms, fires) and through people moving between them. Disturbing this ecosystem interdependence can negatively affect development plans, even when actions are geographically separated by substantial distances. Consequently, the impacts of sectoral activities directly dependent on natural resources (e.g. timber harvesting, fisheries, agriculture, mining) need to be assessed in light of their local and regional disturbances. The same is true for the requirements (e.g. raw material, water, fertile soils) of these sector activities, which need to be assessed based on the type of ecosystem services, their availability, their interdependencies and whenever possible their tangible and non-tangible economic value. Successful planning outcomes are optimized when they weigh trade-offs based on the inter-dependence, and possible impacts of various sectors on the environment. Accordingly, governments should identify what ecosystems are fundamental to development and put in place measures to secure their service flows and resilience. The concept of working with nature (and not against) becomes the main guiding paradigm towards sustainable economic development and poverty reduction. As processes of ecosystem change are not linear, the whole system can collapse without warning. Consequently, effective development measures should look at ways of securing ecosystem resilience and EGS availability for today and for future generations.

A systematic and systemic planning approach can enhance the understanding of how development sectors benefit from ecosystem goods and services, what policies and incentive measures can be reinforcing, and what activities incur the risk of being damaging or unsustainable. Adopting an integrated perspective towards EGS as common benefits to be shared by all stakeholders can allow a better distribution of resources while maximizing their availability. The examples below offer an overview of how development sectors are interlinked and how they can impact the condition and availability of EGS.

For instance, unsustainable agricultural activities can slow economic development, accelerate climate change and affect human well-being in different ways. According to the Food and Agriculture Organization of the United Nations (FAO), 1.1 billion people in the world have no access to clean water while it is estimated that the agricultural sector can represent up to 80% of some countries' water consumption. The economic losses due to a lack of access to safe water and sanitation are estimated to be US\$14 billion per year for Africa alone, equivalent to 5% of GDP across the continent (ECOSOC 2008), with direct repercussions on health and child mortality. The above figures are also to be assessed in terms of other agricultural impacts, which can include the destruction of biodiversity for cash crops (e.g. for soya beans or biofuels), the disruption of hydrological systems by preventing clean water from reaching the water table and other bodies (lakes, rivers, lagoons), as well as the pollution of fresh water bodies through extensive use of fertilizers and pesticides. According to the Millennium Ecosystem Assessment (2005) excessive nutrient loading of ecosystems represents one of the major causes of deterioration today and will grow significantly worse in the coming decades.

Box 7: Thailand — The Conversion Choice: Economics, Private Interest and Public Interest

Looking at the full range of costs and benefits can show whether land conversion makes economic sense. A study in Southern Thailand on conversion of mangroves into commercial shrimp farms showed net private economic returns estimated at US\$ 1,220 per ha per year (10% discount rate), taking into account available subsidies. This return does not integrate rehabilitation costs (US\$ 9,318 /ha) when a pond is abandoned after 5 years of exploitation. The conversion decision is clearly an easy one for those making the private gain but the conclusion changes if the main costs and benefits to society are included. Estimated benefits provided by mangroves, mostly to local communities, were approximately US\$ 584/ha for collected wood and non-wood forest products, US\$ 987/ha for providing nursery for off-shore fisheries and US\$ 10,821/ha for coastal protection against storms, totaling US\$ 12,392/ha (even without considering other services like carbon sequestration) – an order of magnitude larger than the benefits of converting the mangroves to shrimp farming. Only through appropriate policy responses (e.g. clear property rights, permit systems, removal of any perverse subsidies that encourage conversion, compensation mechanisms), can such unbalanced trade-offs be avoided.

Source: EU 2009

However, as ecosystem services come in bundled forms so does their related impacts, meaning that the degradation of one function can also lead to the collapse of other services. Parallel to water and biodiversity, one of the most pressing issues in terms of agricultural disruptions to ecosystems is related to its impacts on climate patterns. According to FAO, the livestock sector generates more greenhouse gas (GHG) emissions than the transport sector in total. Measured in CO₂ equivalent, this amounts to 18 % of global GHG. These emissions are the result of manure, land use, and land use change as forests are

increasingly turned into agricultural lands (FAO 2006). FAO estimates that about 13 million hectares – an area roughly equivalent to the size of Greece – of the world’s forests are cut down and converted to other land uses every year. When forest cover is lost, run-off rapidly flows into streams, elevating river levels and subjecting downstream villages, cities, and agricultural fields to flooding. During the dry season, such areas downstream of deforestation can be prone to long droughts which interrupt river navigation and can disrupt agricultural production and industrial operations. The overall loss of forest cover is primarily attributed to agricultural activities, and the continuous destruction of world forests releases about 2 billion tons of carbon per year, with most of the losses occurring in the tropical forests of Asia, South America, and Africa (Butler 2005). But pressures on forests continue to mount as well from other sources, such as the expanding use of firewood, paper, and lumber. Conversely, forests systems contribute to the availability of fertile soil, pollination, protective wind barriers and the water needed for life and agricultural activities. Forest services extend from local to global levels, from providing raw materials, maintaining biodiversity, and protecting land and water resources, to playing a direct role in rain fall and climate change regulation. At a global level the role of forest ecosystems is becoming increasingly interesting as they act as carbon sinks. This role has considerable potential when captured as carbon markets, and related EGS incentives are estimated at about \$50 billion in 2010 (PEP 2007). Currently deforestation and forest degradation are the second largest cause of global emissions. Estimates indicate that reducing deforestation rates by 50% by 2050 and then stabilizing them at that level until 2100 would avoid the release of 50 Gt carbon this century, which represents 12% of the emission reduction needed in terms of maintaining CO₂ levels within the acceptable limit (Trumper *et al.* 2009).

Box 8: EGS and Development

Sample questions to be asked in terms of the role of ecosystems in development:

- How can ecosystems contribute to greener and new forms of income?
- What are the primary ecosystem goods and services that a country needs to protect?
- What economic activities are depleting ecosystems beyond their resilience levels?
- How can the use of ecosystem goods and services be optimized in terms of development?

The importance of development impacts should be weighed carefully in terms of missed development opportunities (e.g. ecotourism, pharmaceutical developments, etc.), including the possible social and ecosystem restoration costs. Examples of social impacts can include displacement of indigenous populations as ancestral lands and forests are converted for economic purposes; the impacts on health as clean water becomes polluted or inaccessible; and the emergence of conflicts between competing local users (e.g. farmers, forest communities). A multidimensional approach to policy is thus required where ecosystem services are considered holistically in decision making in terms of their tangible and non-tangible value to economic sectors and human well-being (e.g. disease control, disasters reduction, etc.). These ecosystem based perspectives represent the missing elements for an effective way forward securing sustainability and respecting human rights and needs.

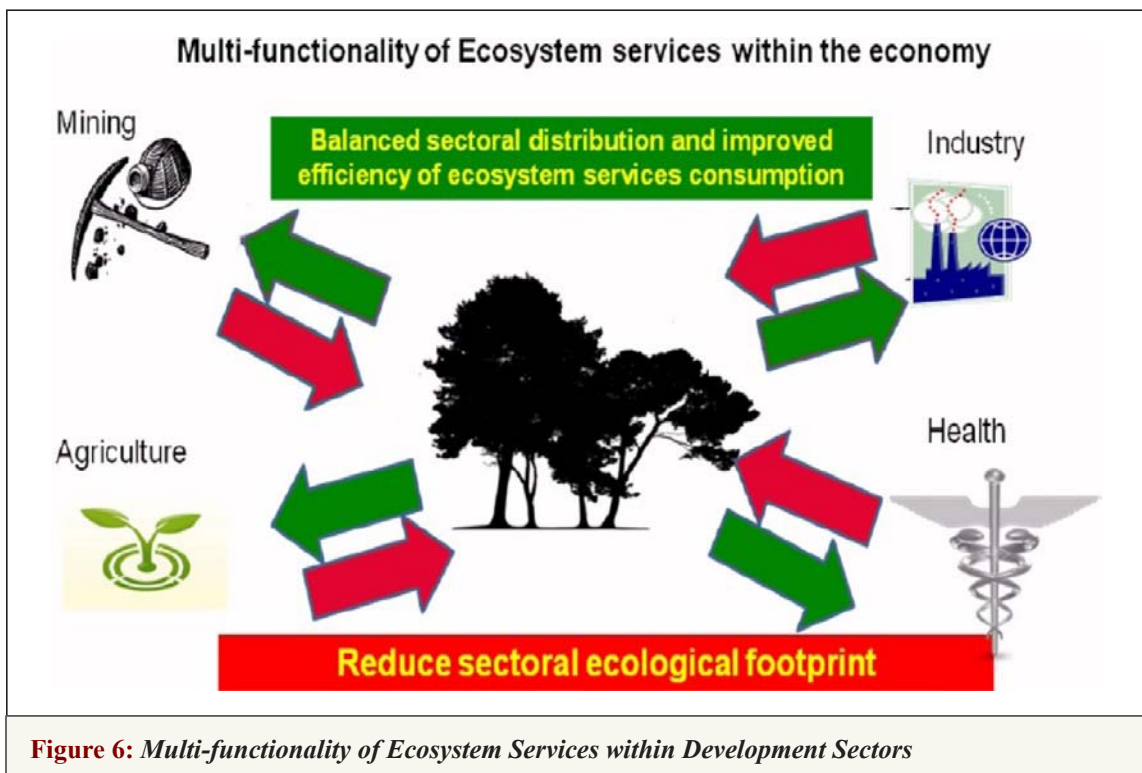


Figure 6: Multi-functionality of Ecosystem Services within Development Sectors



2.2 Ecosystem Goods and Services in the Context of Poverty

As demand for ecosystem goods and services has grown, it is particularly poor people that have lost access to them. For example, significant quantities of fish are caught by large foreign fleets in the waters off western Africa, without substantial local benefits (Greenfacts 2005). Forests ecosystems are home to 300 million people around the world, a third of whom are indigenous peoples, and another 800 million rely on forests for their livelihoods. Three-quarters of the 2.6 billion people who live on less than \$2 a day are dependent upon local natural resources for their livelihoods (WRI in collaboration UNDP, UNEP and World Bank 2008). The poor are often highly dependent for their livelihoods on common property where ecosystems can contribute to multiple resources such as food security, medicine, water, energy, revenue from small enterprises and building material. Close to one billion people live in bamboo houses (INBAR n.d.) where bamboo provides the material for the outside and inside structures of the house.

Acknowledging the prominent role played by nature, pro-poor development planning must be taking into consideration the main ecosystem functions that are critical to providing both income and non-income based benefits to the poor and other vulnerable groups. Some issues become a question of basic human rights, for instance securing access to clean water and food. As Poverty Reduction and National Development Strategies are planned and implemented, understanding the importance of ecosystem goods and services to poverty reduction is also necessary. Table 4 provides examples of linkages between seven of the eight Millennium Development Goals (MDGs), and the benefits brought by ecosystem goods and services.

Box 9: Well-being and Ecosystems

The following 10 constituents and/or determinants of well-being are closely related with ecosystems:

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.

Source: Duraipah 2004

Table 4: Linkages Between Ecosystem Goods and Services and MDGs

MDG 1 Eradicate extreme poverty and hunger	Livelihood strategies and food security of the poor often depend directly on healthy ecosystems and the diversity of goods and ecological services they provide.
MDG 2 Achieve universal primary education	A degraded ecosystem would result in longer time spent collecting water and fuel-wood by children, especially girls, which can reduce total time at school.
MDG 3 Promote gender equality and empower women	Poor women are especially exposed to indoor air pollution and the burden of collecting water and fuel-wood, and have unequal access to land and other natural resources.
MDG 4 Reduce child mortality	Ecosystem disruption can impact on health in a variety of ways: <ul style="list-style-type: none"> ▪ Water-related diseases such as diarrhea and cholera kill an estimated million people a year in developing countries, the majority of which are children under the age of five. ▪ Vector-borne diseases can be the result of degraded ecosystems
MDG 5 Improve maternal health	Indoor air pollution and carrying heavy loads of water and fuel-wood adversely affect women's health and can make women less fit for childbirth and at greater risk of complications during pregnancy.
MDG 6 Combat major diseases	Up to one-fifth of the total burden of diseases in developing countries may be associated with environmental risk factors— and preventive environmental health measures are as important and at times more cost-effective than health treatments.
MDG 7 Ensure environmental sustainability	Current trends in environmental degradation must be reversed in order to sustain the health and productivity of the world's ecosystem.

Source: PEI 2008

This dependence can be briefly summarized in terms of the following points (UNESCAP 2003):

- The poor live in places which are ecologically more vulnerable and are forced to earn their living from low-productivity natural resources;
- It is commonly observed that poor households especially in rural areas derive their livelihood income from natural resources;
- It is apparent that the intensity of suffering of the poor from the adverse impacts of environmental disasters is much higher than that of the rich.

Equitable and pro-poor development could be achieved by increasing poverty resilience, taking into account EGS dimensions and their linkages to the poor and other vulnerable groups (see box 10).

Conversely, the poor can be the cause of potentially degrading ecosystem activities. The fact is that poverty and the loss of ecosystems and biodiversity are inextricably intertwined. These can stem from various practices such as the collection of firewood or over-hunting of bush meat, which have negative impacts on existing ecosystems and related biodiversity.

Pro-active development policies that include ecosystem dimensions and their role in alleviating poverty can lead to multiple benefits such as:

- Identifying new sources of revenues for poor and vulnerable groups;
- Providing an equitable form of development that takes into consideration the basic rights of poor and other vulnerable groups;
- Preserving traditional cultures/ knowledge;
- Securing equitable access and benefit sharing of resources;
- Providing a pro-active means to reduce the risks and impacts of natural disasters on exposed communities;
- Reinforcing the land rights of poor and vulnerable groups.

2.3 Ecosystem Goods and Services in the Context of Disasters and Climate Change

The poor are particularly vulnerable to shocks arising from environmental change, conflict and natural disasters. They tend to live on hillsides or flood plains and in unsubstantial housing and are therefore most directly

Box 10: Poverty and Ecosystem Resilience

Resilience is the capacity to adapt and to thrive in the face of challenge [...] When the poor successfully (and sustainably) scale up ecosystem based enterprises, their resilience can increase in three dimensions: They can become more economically resilient — better able to face economic risks; they and their communities can become more socially resilient — better able to work together for mutual benefit; and the ecosystems they live in can become more biologically resilient — more productive and stable.

Source: WRI in collaboration UNDP, UNEP and World Bank 2008

Box 11: Gender and Poverty

Seventy percent of the world's poor are women. Unlike men, women's opportunities and options for working their way out of poverty are restricted by cultural norms that control their social and economic mobility. Women's opportunities are often limited by their unequal access to land, technology and credit, and their susceptibility to discrimination.

Every hour 720 girls and boys die of hunger, while 842 million people go undernourished. Drought ranks as the single most common cause of severe food shortages in developing countries and is the cause in 60% of food emergencies. Undernourished women give birth to underweight babies, decreasing their chance of survival. Because women in South Asia face high levels of discrimination in accessing food and health care, the region now experiences one of the world's highest rates of low-weight births.

Regular access to irrigation water increases agricultural yields, helping to provide more food and higher incomes to three-fourths of the world's poor and hungry who live in rural areas. Women play a major role in food production in many of those areas, particularly in Africa. In Sudan, women make up 30% of the labor force in food production, 48% in Burkina-Faso and 80% in Congo.

In many parts of the world, women do not have the same land ownership rights as men do. For example, fewer than 1 in 10 female farmers in India, Nepal, and Thailand own land. And landlessness is on the rise in Latin America, especially Mexico, where women make up only 21% of total property owners, despite approved land reform.

Women earn only 70-80% of men's income earnings in both developed and developing countries. Only about 20% of this difference can be explained by such variables as education levels, experience, and job characteristics.

Two billion people do not have access to regular energy sources. Women of all developing countries spend between 2 and 9 hours each day collecting fuel and fodder. Indoor air pollution, produced from burning biomass fuels such as wood, charcoal, or dung, is estimated to kill 2 million women and children every year.

More than 500,000 women die every year during pregnancy or childbirth. A study in Uttarachal, India, found miscarriages to be five times the national average at 30%, and links this to women carrying heavy loads of water and fuel during pregnancy. In Nepal, women suffer a high incidence of uterine prolapse, which is associated with carrying heavy loads of wood soon after childbirth. In contrast, men of the developing world spend about one-tenth of the time that women do on this daily task.

Source: Silvia Lara



affected by natural calamities. When disaster strikes they have the fewest assets to consume or sell, or savings to draw on (Yaron and White 2002). The Global Assessment Report on Disaster Risk Reduction states that climate change will magnify the uneven distribution of risk, skewing disaster impacts even further towards poor communities in developing countries (Doyle 2009). The International Organization for Migration (IOM) predicts that the number of people that will have to move due to climate change and environmental degradation by 2050 varies between 25 million and one billion (Andersen 2009).

Many forms of natural disasters can be linked to mismanagement of natural resources, weak development strategies, and a poor understanding of ecosystem dynamics (see Figure 7). Reducing the exposure of poor communities to such extreme events and increasing their chances of survival could be dramatically enhanced by reinforcing ecosystem resilience. Sound ecosystem management can contribute to effective reduction of the risk of natural disasters and in dealing with its consequences in two major ways. Well-managed ecosystems can mitigate the impact of most natural hazards, such as landslides, hurricanes and cyclones. In addition, productive ecosystems can support sustainable income-generating activities and are important assets for people and communities in the aftermath of a disaster (Sudmeier-Rieux *et al.* 2006). These ecosystem benefits can become part of disaster prevention, mitigation and adaptation measures (see box 13).

In general, the poor will be the first to benefit from investments in ecosystems. In this context the capacity to find alternative options to costly mitigation measures can be achieved through well-managed ecosystems, which can play a positive role in allowing poor populations to meet urgent needs such as shelter, access to clean water, and provisions in times of disasters. There are 5 reasons to integrate ecosystem-based management in disaster risk reduction and development planning (Sudmeier-Rieux *et al.* 2006):

1. It can decrease vulnerability to natural disasters;
2. Natural disasters have a high cost;
3. It costs less to prevent disasters than it does to fix the damage they cause;
4. At-risk populations depend on ecosystems for their livelihoods;
5. Natural disasters and the responses to them have a negative impact on biodiversity.

The vulnerability of the poor to such random events carries a double human and economic cost, which can be reduced through adaptation and pro-active prevention measures. The IPCC defines adaptation as an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (JLG 2007). Adaptation is important to all countries, particularly least-developed countries (LDCs) and Small Island Developing States (SIDS), whose economies are heavily dependent on climate-vulnerable sectors, such as agriculture, tourism and fisheries, and which have limited ability to adapt. Adaptation activities can be technological (such as increased sea defenses), policy-based (such as improved risk management), behavioral (such as the sparing use of water in times of drought) or managerial (such as improved forest management).

Box 12: EGS and Poverty

Questions to be asked in terms of the role of ecosystems in reducing poverty:

- How can the access to EGS be optimized to better secure the livelihoods of poor and vulnerable groups?
- What are the potential win-win solutions that can be put in practice between poor and vulnerable communities and development sectors?
- What vital EGS need to be protected to secure the livelihoods of poor and vulnerable groups?
- How to involve poor and vulnerable groups in decision making processes and policy development (when necessary)?

Box 13: Viet Nam — Mangrove Planting Saves Lives and Money

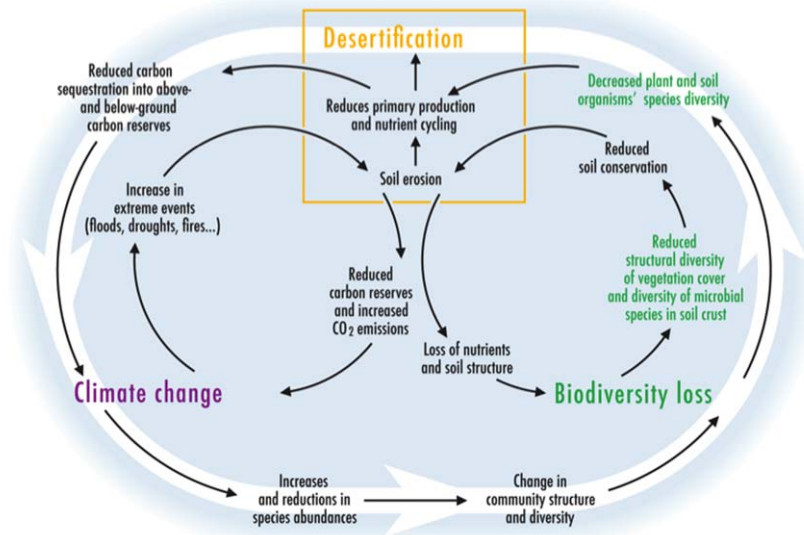
Viet Nam is one of the most typhoon-lashed nations in Asia. Every year, an average of four sea-borne typhoons and many more storms wreak havoc on this low-lying country.

Tropical cyclones have caused a considerable loss of livelihood resources, particularly in coastal communities. Mangrove ecosystem rehabilitation along much of Viet Nam's coastline is an example of a cost-effective approach to improving coastal defenses while generating local livelihoods. Since 1994, the Viet Nam National Chapter of the Red Cross has worked with local communities to plant and protect mangrove forests in northern Viet Nam. Nearly 120 km² of mangroves have been planted, with substantial resulting benefits. These submerged, coastal forests act as buffers against the sea, reducing potentially devastating 1.5-metre waves into harmless, centimeter-high ripples. Although planting and protecting the mangroves cost approximately US\$1.1 million, it saved US\$7.3 million/ year in dyke maintenance.

During the devastating typhoon Wukong in 2000, project areas remained unharmed, while neighboring provinces suffered huge losses in lives, property and livelihoods. The Viet Nam Red Cross has estimated that some 7,750 families have benefited from mangrove rehabilitation. Family members can now earn additional income from selling crabs, shrimp and mollusks, while increasing the protein in their diets.

Source : UNEP 2007 and IFRC 2002

Linkages and feedback loops among desertification, global climate change and biodiversity loss



Notes: Green text: major components of biodiversity involved in the linkages.

Bold text: major services impacted by biodiversity losses. The major components of biodiversity loss (in green) directly affect major dryland services (in bold). The inner loops connect desertification to biodiversity loss and climate change through soil erosion. The outer loop interrelates biodiversity loss and climate change. On the top section of the outer loop, reduced primary production and microbial activity

reduce carbon sequestration and contribute to global warming. On the bottom section of the outer loop, global warming increases evapotranspiration, adversely affecting biodiversity; changes in community structure and diversity are also expected because different species will react differently to the elevated CO₂ concentrations.

Source : (UNEP/GRID-Arendal 2009b)

Figure 7: Linkages and Feedback Loops Among Desertification Global Climate Change And Biodiversity Loss



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Scientific observations indicate that the pattern of disaster risk is changing with the increase in the number and intensity of natural calamities over the last decades (see Table 5). Economic losses from these disasters have averaged about \$40 billion a year, which is more than a sevenfold increase in real losses since the 1960s (World Bank 2008). Low-income and emerging economies, especially in Asia and South America, are particularly at risk. The humanitarian responses to disasters now cost donors \$6 billion per year, or a total of 7% of total ODA flows — a figure which is likely to rise (ECOSOC 2008).

As demonstrated through this second section the inter-linkages between ecosystem dynamics can lead to multiple impacts and benefits in terms of development, poverty reduction and disaster policies. The important roles of these natural services are not being recognized adequately in economic markets, government policies or land management practices. As a result, ecosystems and the services they provide remain in decline overall. The objective of the following sections will be to discuss and introduce a series of tools and approaches to be adopted at different levels of policy and budget planning.

Table 5: Number of Natural Disasters 1930-2006

	1930-1939	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2006
Drought	14	49	n/a	53	125	196	151	185
Earthquake	30	45	46	70	98	197	263	190
Epidemic	2	3	2	37	59	122	350	413
Extreme temperature	2	n/a	8	9	15	40	94	140
Famine	2	1	n/a	2	3	12	47	9
Flood	12	12	81	156	265	537	800	984
Insect Infestation	1	1	n/a	n/a	5	48	11	16
Slide	5	4	21	26	54	105	148	126
Volcano	3	7	10	12	23	32	52	32
Wave/surge	4	n/a	4	6	3	3	10	16
Wildfire	1	3	1	8	26	62	100	102
Windstorm	38	52	121	211	291	558	741	647
Total	114	177	294	590	967	1,912	2,767	2,860

Source: Sudmeier-Rieux et al. 2006

Table 6 : Vulnerability to Changes in Ecosystem Services

West Indian Ocean Communities', Households' and Individuals' Vulnerability to changes in Ecosystem Services	Who is vulnerable?
	Asset-poor households
	Children (girls specifically) and the young
	Chronically ill, sick, HIV/AIDS infected individuals and households and high-altitude communities (lack of malaria immunity)
	Disabled
	Disadvantaged communities
	Elderly and Elderly-headed households
	Fishers and fishing communities (especially small-scale fishers)
	Island communities
	Isolated communities (especially isolated rural communities)
	Malnourished individuals
	Orphans
	Poor or indigent
Rural communities	
Women (especially widows and pregnant women) and members of female-headed households	

Source: Bunce et al. 2008

Box 14: Gender and Climate Change

Climate change is likely to exacerbate both natural disasters and conflict over natural resources at all levels. Men and women often bring different skills to their households, communities and countries with respect to conflict management.

Environmental change due to climatic causes is likely to drive migration. Men migrate more often than women do, both seasonally or for a number of years. In dryland areas, female-headed households left behind are often the poorest, and wives of seasonal migrants may not receive remittances or have sources of income. The workloads of these women, their children and the elderly increase significantly as a result of male out-migration.

During emergencies, women are less likely to have access to information about assistance than men.

Women constitute up to 80% of refugee and displaced populations worldwide, and in emergency situations women and children may typically make up 70 to 80% of those needing assistance.

Without secure access to and control over natural resources (land, water, livestock, trees), women are less likely to be able to cope with permanent climatic change or willing to make investments in disaster mitigation measures.

Climate change adaptation measures, including those related to anti-desertification, are often labor intensive.

Women are often expected to contribute unpaid labor to soil and water conservation efforts. Too often, these measures focus on women’s practical needs (e.g., safe drinking water, fuelwood) rather than on their strategic interests, such as participation in climate change planning and governance processes.

More women than men work in the informal sector and in small enterprises. These sectors are often the worst hit and least able to recover from the effects of disasters (because of their low levels of capital accumulation and weaker access to credit and information, among others).

Source: Lorena Aguilar n.d.

Box 15: Forms of Hazards

Examples of Climate Related Hazards

- Flooding (flash);
- Drought and low flows;
- Landslides;
- Intense rainfall;
- Extreme temperatures;
- Heat waves.

Example of Human Vulnerabilities and Livelihood Impacts

- Reduced agricultural production;
- Water shortage and/ or groundwater depletion;
- Flooding;
- Food security;
- Income generation.

Box 16: EGS and Natural Disasters

Questions to be asked in terms of the role of ecosystems in reducing vulnerability and increasing resilience to natural disasters:

- How can ecosystems contribute to reducing the impact of natural disasters?
- How can ecosystems contribute to increasing resilience of poor communities?
- What risks do degraded ecosystems present and why?
- What are the main ecosystem goods and services that contribute towards reducing the vulnerability of poor communities during and in the aftermath of disaster situations?



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SECTION 2 SUMMARY

Concept/Issues Overview	Definition/Details	Some Facts/ Recommendations
<p>Ecosystem Goods and Services and Economic Development Sectors</p>	<p>Ecosystems are not isolated entities, rather there are always interactions between them through the range of species which compose ecosystems the services they provide, other natural functions and events (e.g. storms, fires) and through people moving between them. Ecosystem services come in bundled forms and losing one of them might impact other dependent services.</p> <p>Disturbing this ecosystem inter-dependence can negatively affect development plans as ecosystem goods and services are indispensable assets for development.</p>	<ul style="list-style-type: none"> ▶ According to the United Nations Food and Agriculture Organization 1.1 billion of the world population have no access to clean water; ▶ The agricultural sector can represent up to 80% of some countries' water consumption; ▶ Forest services extend from local to global levels; ▶ Carbon markets and related EGS incentives are estimated at about \$50 billion in 2010. <p>An integrated look at EGS as common benefits to be shared by all economic sectors and stakeholders can allow a better distribution of resources, while maximizing their availability.</p> <p>Ecosystem services are best considered holistically in decision making in terms of their tangible and non-tangible value to economic sectors and human well-being.</p>
<p>Ecosystem Goods and Services in the Context of Poverty</p>	<p>As demand for ecosystem goods and services has grown, it is particularly poor people that have lost access to them.</p> <p>Poverty and the loss of ecosystems and biodiversity are inextricably intertwined.</p> <p>Pro-active development policies include ecosystem dimensions and their role in alleviating poverty.</p>	<ul style="list-style-type: none"> ▶ Close to 2 billion people who live on less than \$2 a day are dependent upon local natural resources. <p>Pro-poor development planning can look at main ecosystem functions that are critical to providing both income and non-income based benefits to the poor and other vulnerable groups.</p>
<p>Ecosystem Goods and Services in the Context of Disasters and Climate Change</p>	<p>The poor are particularly vulnerable to shocks arising from environmental change, conflict and natural disasters.</p>	<ul style="list-style-type: none"> ▶ In the past decade, economic losses from natural disasters have averaged about \$40 billion a year, which is more than a sevenfold increase in real losses since the 1960s. <p>Sound ecosystem management can contribute to effective reduction of the risk of natural disasters and in dealing with its consequences. Well-managed ecosystems can mitigate the impact of most natural hazards. In addition, productive ecosystems can support sustainable income-generating activities and are important assets for people and communities in the aftermath of a disaster. EGS based disaster strategies can represent a vital extra form of low cost insurance.</p>

3 Building Governance and Vision

Guiding Questions for Policy Makers :

- How to foster sound environmental governance that will facilitate the implementation of pro-active environmental measures?
- How to establish a legal background that takes into consideration economic development needs without impacting on the livelihoods and the rights of the poor?
- How to build a long-term development vision that takes into consideration the benefits of the environment?
- What policy development mechanism could be made available to capture the views of all stakeholders concerning the use and access to environmental resources?
- How to develop a culture and society built around environmental values?
- How to develop strategies, appropriate governance structures, multi-stakeholder platforms and legal frameworks to equitably involve all concerned stakeholders?
- How to negotiate in the global policy arena acceptable win-win outcomes and/or trade-offs between biodiversity conservation, maintenance of ecosystem services, development and poverty reduction?
- How to communicate possible synergies and trade-offs in a transparent way to all stakeholders involved to lead to informed decisions?
- How to introduce incentive and compensation mechanisms where trade-offs are necessary, being aware that opportunity costs could vary and increase over time?
- How to identify instruments approaches and strategies to maintain social equity and peace including, if appropriate, conflict management and crisis prevention?

3.1 Good Environmental Governance

As described in previous sections, strategies with weak environmental considerations could leave developing countries vulnerable to shocks (whether economic, social or environmental in origin) and increasingly dependent on external sources of aid. Poor planning and decision making occur when nature is viewed from a narrow perspective, such as the direct commodities and tradable goods (e.g. minerals, energy, food) it provides. Planning and Finance Ministries have the responsibility to oversee sector strategies based on national priorities and according to the potential role of each sector. When environment is regarded as a cross-cutting theme it can contribute to a better understanding of sectoral needs in terms of their dependence on shared ecosystems goods and services. To this effect environmental dimensions cannot be separated from the activities and objectives of other ministries, as their performance remains directly or indirectly dependent on healthy and productive ecosystems. Effectively mainstreaming environmental dimensions into planning reinforces sustainability through strategic thinking. This could be achieved by raising the role of ecosystem goods and services to higher priorities within planning processes. For instance, weighing the existing trade-offs between transforming/exploiting an ecosystem (e.g. for agricultural purposes, road infrastructures, timber or mining exploitation, dam construction, etc.) and maintaining it in its original state for the services it provides, is one of the critical questions to be addressed.



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Policy and finance officers are essentially faced with one of the following two development pathways. The first is a *business as usual* approach geared towards immediate benefits, while discarding consequences of any action that can increase the pressure on ecosystems and compromise the interests of future generations. This vision is based on standard economic models looking at human-produced capital (people, machines, industries, etc.) as the main source of growth and development over the short-term. The second is to adopt long-term based objectives with sustainable practices, carefully accounting for the ecosystem resilience thresholds and contributions of sustainable socio-economic development. It can be best achieved by shifting policy thinking towards determining long-term benefits and impacts of sector activities on nature, as opposed to considering the environment as a mere externality.

The need to factor longer time frames into decision making should be based on the role of ecosystems, their capacity to sustain change, and both their monetary and non-monetary benefits. Understanding environmental linkages to poverty and development should not only be limited to the responsibilities and technical capacities of the Environment Ministry. Many government bodies from municipal to national levels can find direct and indirect benefits when factoring ecosystem goods and services in their plans:



- The Environment Ministry can explore and stress the socio-economic benefits of ecosystem goods and services. This can enhance its pro-active contribution towards reducing poverty and ecosystem-related natural hazards. This can culminate in additional support (political/financial) to environmental programmes, as these can provide stability, sustainability and benefits to other sectors;
- The Finance Ministry can look at the environment as a source of revenue rather than expenditures or a 'green barrier' to economic objectives. This can result in looking for new opportunities to generate greener income;
- The Planning Ministry can look at development objectives more holistically. This can offer an integrated approach to planning with better chances of sustainability and coordination between communities and development sectors according to available services and equitable sharing of environmental resources;
- Sector ministries can include in their strategies clear environmental opportunities resulting from the sustainable use of ecosystem services to help achieve their sector's objectives. This can strengthen understanding about the respective interdependence on common ecosystems goods and services and the way resources need to be distributed, maintained and sustainably managed;
- Sub-national governments (e.g. Provincial and Municipal) can determine their inter-dependence on local ecosystems and common ecosystem services in relation to issues such as water management, disaster management, food security, population requirements.

In this context, the Environment Ministry can offer new and pro-active approaches to policy development and provide the missing biodiversity and ecosystem management 'lens' needed for planning. Environmental policies become more than restrictive measures of pollution control and abatement, or simply protection of nature and its biodiversity. It is necessary to recognize natural infrastructure as socio-economic units of production and stability for human well-being. The Environment Ministry as a pro-active player, and not just the *green police*, can contribute towards economic growth and poverty reduction by presenting alternative paths towards improved human well-being. Policies for pro-poor and equitable development become possible when economic development is in line with environmental considerations. Some of the main reasons for linking environmental dimensions to development policy (Environment Helpdesk - EC DC n.d.) are:

- EGS links with poverty and poverty reduction;
- EGS links with economic activity;
- EGS links with health and vulnerability risks;
- EGS is of importance for peace and security in the context of scarce resources;
- EGS addresses the challenges of climate change.

Environmental mainstreaming may increase gradually, with improved understanding of biodiversity issues in a sector, or suddenly, when an opportunity for mutual benefits presents itself. Governments have to be ready for mistakes to happen, however and trade-offs remain necessary before identifying the point of success for balanced and adequate development policies (Petersen and Huntley 2005). There are no quick or generic recipes for greening policies and budgets, rather approaches vary from one country to another according to many issues such as the geographical contexts, resources and social needs.

A variety of approaches/tools are often required to build a case for integrating and accounting the benefits of ecosystem goods and services within policy, planning and budgeting processes. The following sections will cover some of the main approaches to mainstream pro-active environment measures effectively within planning. The success of environmental policy relies on adequate environmental governance structures, a sound legal background, and development of a green vision for the future. Principles of "good governance" related to the work of UN agencies and highlighted at the Vth World Parks Congress (Duran September 2003) include:

- Legitimacy and Voice;
- Transparency;
- Accountability;
- Equity / Fairness;
- Vision / Direction;
- Performance;
- Respect of human rights.

An important step that governments can take to generate support for pro-active environmental policies is adoption of a national vision built around greener development initiatives. Transparent and effective governance mechanisms are needed to complement political support for environmental policies and help transform the vision into actions. Three main factors are identified that can shape the management of natural resources and governance-related arrangements (OECD 2009):

1. The characteristics of natural resources (water, minerals, timber, etc.);
2. The actors involved (private and the public, business and consumers, as well as poor local communities and Indigenous Peoples);
3. The institutional framing and rules (Role of ministries and government institutions).

The characteristics of natural resources and associated development activities can determine the types of impacts and consequently the mitigation measures to be adopted. However, poor governance can result in preventing adequate implementation of both pro-active (e.g. EGS based initiatives) and responsive (e.g. pollution abatement, ecosystem restoration, erosion control) measures.

Various stakeholders can influence the governance of ecosystem services at a country level, including private players in the global market, donors, in-country political actors and other parties with powerful interests. To be successful, environmental policies have to be accepted by all concerned players. The management and use of natural resources usually implies the participation of different stakeholders that often have conflicting interests. Some of these can play an influential role in determining the overall use of ecosystems and biodiversity. Poor governance can be characterized by unbalanced or narrow application of governing powers, whereby decisions on ecosystem uses are not accountable to poor communities, and corruption and vested interests reinforce the marginalization of the poor.

Consequently, good governance should establish the necessary policy structures that take into consideration the challenges (financial, political pressures, logistical issues, etc.) which poor and vulnerable groups might face in participating in decisions, and avoid situations where elite can capture most benefits (Bunce *et al.* 2008). The need to involve all stakeholders reinforces the quality of legitimized and sustainable results and the equitability of the policy process. CBD COP 9 Decision (9/8) highlights the need to involve all players in the development of National Biodiversity Strategies and Action Plans (NBSAPs) (see box 17).

The importance of securing equitable access and benefit sharing to natural resources appears as the 3rd objective of the CBD. With time, this objective has gradually expanded to include new mechanisms to share broader ecosystem goods and services. Recent decisions adopted by the CBD explicitly refer to the *equitable sharing of the benefits from the utilization of biological diversity* in the context of ecosystem and biodiversity issues ranging from environmental impact assessment to plant diversity to ecotourism (Bishop *et al.* 2008). The socio-economic dimension is also particularly addressed within the actual version of the CBD Strategic Plan beyond 2010 through the following target: “By 2020, ecosystems that provide essential services and contribute to health, livelihoods and well-being, are safeguarded and/or restored and equitable access to ecosystem services is ensured for all, taking into account the needs of women, indigenous and local communities and the poor and vulnerable”.

For instance Poverty Reduction Strategy Papers (PRSPs) of Uganda and Honduras have begun addressing issues of access and control of natural resources in response to concerns expressed in consultations with civil society (WRI n.d.). Vulnerable groups whose land rights are often fragile, and based on shaky legal grounds, fall victim to unsustainable resource exploitation activities. Poorly planned development can limit the access to resources and can drastically transform ecosystem functions and services resulting in negative impacts on the livelihoods of poor and vulnerable groups.

A country can review how natural resources are controlled and shared by communities and the private sector and consequently adopt changes for their equitable use. This is done by looking at the impacts of economic activities but also at the positive role of local communities in contributing to healthy ecosystems through traditional practices, and recognizing how these can be beneficial to society and the economy.

Box 17: CBD Conference of the Parties Decision 9/8 — Engaging all Stakeholders

Engage indigenous and local communities, and all relevant sectors and stakeholders including representatives of society and the economy that have a significant impact on, benefit from or use biodiversity and its related ecosystem services. Activities might include:

- I. Preparing, updating and implementing national biodiversity strategies and action plans with the participation of a broad set of representatives from all major groups to build ownership and commitment;
- II. Identifying relevant stakeholders from all major groups for each of the actions of the national biodiversity strategies and action plans;
- III. Consulting those responsible for policies in other areas so as to promote policy integration and multidisciplinary, cross-sectoral and horizontal co-operation to ensure coherence;
- IV. Establishing appropriate mechanisms to improve the participation and involvement of indigenous and local communities and civil society representatives
- V. Striving for improved action and cooperation to encourage the involvement of the private sector, namely through the development of partnerships at the national level;
- VI. Strengthening the contribution of the scientific community in order to improve the science/policy interface to support research-based advice on biodiversity;

Source: SCBD COP 9 Decision IX/8/m

**Box 18: Ecosystem Services have until now benefited the rich**

Global changes in the supply of ecosystem services have disproportionately benefited the rich. For example, while the supply of clean water has increased in most of the world, half of the urban population in Africa, Asia, Latin America, and the Caribbean does not have access to clean water and suffers reduced health and higher costs of obtaining water. Similarly, land clearing for forest plantations in Indonesia degraded air quality for 20 million people and increased health care costs an additional US\$9.3 billion. The poor have also lost access to ecosystem services due to the expropriation of common pool resources. For example, in many tropical countries coastal fisheries that formerly provided an inexpensive source of protein and supplemental income, have been destroyed due to shrimp farming and other forms of aquaculture. The benefits of aquaculture go to a small group, while the costs are imposed on the local poor.

Source: Duraiappah *et al.* 2008

Box 19: Learning from Community Forestry: Recognizing Rights and Advancing Democratic Forest Governance Globally

Declaration from the Community Forestry International Workshop Pokhara — September 18, 2009

[...] the 200 representatives of diverse stakeholders from communities, governments, civil society and other development partners from over 30 countries working in forestry and development, hereby declare that:

Point 1: Governments and policy makers should guarantee the human, civil, customary and property rights of local people over land and forest resources, including the recognition of the authority of forest communities to identify and pursue their own development objectives, by incorporating these rights into national laws, constitutions and all forest policies and programs.

Point 4: Governments and the private sector should properly acknowledge, account for and financially reward the contributions of communities in creating environmental public goods; and foster financial mechanisms through which local communities can realize greater value from their forests, such as payments for various environmental services;

Point 7: Government policy should promote the development of community-based forest management institutions and expand the area of forest under community rights and management.

Source: Community forestry Workshop 2009

Under certain circumstances, a government can partially (or fully) delegate the management of public lands to poor communities as a way of empowering them and limiting the sources of pressure on ecosystems. A thorough understanding of the dynamics of linking poor communities to their neighboring environment can help governments identifying suitable initiatives to empower them. Introducing clearer land rights coupled with appropriate incentive measures (recognizing the positive role poor and vulnerable groups can play), are ways of combating poverty. In the absence of adequate land rights, enforcement and incentive measures, conflicting needs can arise resulting in competition between different users of the same services with certain elite groups monopolizing their access.

Environmental governance is more complex than governance linked to the usual socio-economic sectors. Governments have a significant role to play in environmental management, but this role tends to be less clear than in other areas of their work. In many developing countries the institutional structure of the environmental sector is still weak, and the technical and analytical capacity for addressing environmental opportunities and challenges is limited (Neil and Cabral 2007). The distribution of responsibilities among ministries implies that the role of the Environment Ministry remains secondary with its powers often limited compared to conventional sectors (e.g. agriculture, forestry, and fishery). The result can be weakened and fragmented environmental governance. For a positive change to occur, the institutional structure can evolve allowing for a broader and proactive involvement of the Environment Ministry in policy and budget planning. As a cross-cutting theme, the environment can have positive synergies with, or be negatively impacted by, other sectors. Stronger environmental governance in the natural resource sectors is critical to ensure that (a) these sectors contribute optimally to future growth, and (b) economic growth does not come at the cost of ecosystem degradation. In sectors such as forestry and mining more transparent and accountable fiscal management of relevant government agencies is of particular importance to avoid short-lived consumption of natural resources that will leave a country poorer than before (Palerm *et al.* 2006).

3.2 A Sustainable Development Vision

Following the 1992 Rio Summit countries made a commitment to develop National Sustainable Development Strategies (NSDS) and established their respective long-term (~20-year) development objectives. NSDS as master plans for sustainable development are defined as **a strategic and participatory process of analysis, debate, capacity strengthening, planning and action**

towards sustainable development (OECD 1999). To secure lasting political support an NSDS is built in consultation with government institutions, civil society and the private sector, bringing together their aspirations concerning their country's development vision. It is a continuous learning process based on new experiences and results achieved. These strategies stress economic, social and environmental considerations by identifying the main priorities and achievable objectives over the long run. An NSDS serves as an umbrella framework for medium-term development plans like Poverty Reduction Strategies or other mid-term National Development Plans and management capacities, while anchoring the long-term vision based on the directions received through the consultative process. They include objectives such as poverty eradication, food security, energy security, good governance, and sound ecosystem management to name a few. Within NSDS priorities, governments can include the role of ecosystems for human development as a clearly visible objective. Attention to EGS issues at this relatively high level of strategic government planning can provide the necessary political support to integrate greener and pro-active measures in policies and other sector objectives. The ecological dimension can be visible within the NSDS of various countries such as the *Enhanced Philippine Agenda 21* (see box 20), which represents an iteration of the original 1997 Philippine Agenda 21.

Box 20: Enhanced Philippine Agenda 21

The 2009 Enhanced Philippine Agenda 21, [...] is a thematic program covering the following areas: (i) Eradicating Poverty; (ii) Managing Globalization; (iii) Achieving Social Equity; (iv) Securing Peace and Solidarity; (v) Maintaining Ecological Integrity; and (vi) Promoting Empowerment and Good Governance.

Source: Philippine Council for Sustainable Development 2009

3.3 Green Constitutions and Legal Initiatives

Countries such as Ecuador and Bhutan have taken the step to include environmental dimensions in their respective constitutions. Such initiatives taken at the national level confer additional political support and legal reform opportunities to natural capital and its role in development. They further entrench an environmental vision within legal and constitutional mechanisms.

Box 21: Ecuador Constitution

After many years of environmental destruction especially due to oil extraction activities, Ecuador has approved a new constitution that is the first in the world to extend "inalienable rights to nature."

Source: Smith 2009

Article 71 states that the environment, or Pachamama, has the right to be respected and that its cycle structure, functions, and evolutionary processes should be maintained and regenerated. Every person, community, and nationality should enforce the rights of nature, the article maintains, while the state is to provide incentives to protect nature and promote its rights.

Article 74 provides a description of the rights of people, communities, and nationalities to benefit from the environment and natural riches that allow them to live well.

Source: Government of Ecuador 2008

Box 22: Environmental Commitments in the Constitution of the Kingdom of Bhutan

Article 5 :Environment

1. Every Bhutanese is a trustee of the Kingdom's natural resources and environment for the benefit of the present and future generations and it is the fundamental duty of every citizen to contribute to the protection of the natural environment, conservation of the rich biodiversity of Bhutan and prevention of all forms of ecological degradation including noise, visual and physical pollution through the adoption and support of environment friendly practices and policies.

2. The Royal Government shall:
 (a) Protect, conserve and improve the pristine environment and safeguard the biodiversity of the country;
 (b) Prevent pollution and ecological degradation;
 (c) Secure ecologically balanced sustainable development while promoting justifiable economic and social development; and
 (d) Ensure a safe and healthy environment.

3. The Government shall ensure that, in order to conserve the country's natural resources and to prevent degradation of the ecosystem, a minimum of sixty percent of Bhutan's total land shall be maintained under forest cover for all time.

4. Parliament may enact environmental legislation to ensure sustainable use of natural resources and maintain intergenerational equity and reaffirm the sovereign rights of the State over its own biological resources.

5. Parliament may, by law, declare any part of the country to be a National Park, Wildlife Reserve, Nature Reserve, Protected Forest, Biosphere Reserve, Critical Watershed and such other categories meriting protection.

Source: Dalal-Clayton and Bass 2009



3.4 Global Environmental Commitments

A country's long-term vision is meant to shape and influence its development objectives. This vision will most likely include the national priorities as well as commitments found in ratified Multilateral Environmental Agreements (MEAs). At the national level, commitments to comply with Multilateral Environmental Agreements (see Table 7) serve not only as guidance for policy and development priorities, but can provide opportunities and mechanisms for building EGS based measures. Under these MEAs, many incentives can come from the donor community and private sector companies offering monetary and non-monetary benefits for participation in programmes dedicated to biodiversity conservation, carbon sequestration, ecosystem restoration and more.

Multilateral Environmental Agreements focus primarily on the environment but can include links to the Millennium Development Goals as a guide to medium- and long-term country visions. Numerous MEAs reference the issue of conserving biodiversity and associated ecosystem services. The latter are increasingly reflected in MEAs as a complementary means to address poverty reduction, gender issues, human rights, etc. For instance, within the Convention on Biological Diversity environmental topics and associated ecosystem goods and services are linked to poverty reduction, access and benefit sharing, traditional knowledge, and more. This human development dimension is found across various CBD Decisions, including 2010 targets (see box 23) to help reduce the rate of loss of biodiversity, adopted in 2002 by the Conference of the Parties:

The socio-economic dimension is also particularly addressed within the actual version of the CBD Strategic Plan beyond 2010: *“By 2020, ecosystems that provide essential services and contribute to health, livelihoods and well-being, are safeguarded and/or restored and equitable access to ecosystem services is ensured for all, taking into account the needs of women, indigenous and local communities and the poor and vulnerable”.*

MEAs can set the scientific and policy stage for countries to sustainably manage their trans-boundary ecosystems reducing the risks of natural disasters and conflicts between neighboring nations while improving economic returns. Consequently, MEAs can facilitate the adoption of policy measures for the sound management of biodiversity and ecosystems by promoting dialogue between neighboring countries and aligning global environmental efforts. There are close to 100 Multilateral Environmental Agreements (see Table 7 for some examples).

Parallel to MEAs, international forums advance environmental policy work between countries. For instance the United Nations Forum on Forests and the United Nations Permanent Forum on Indigenous Issues both include the goals of developing greener policies.

Having covered some of the background elements required for good governance and a long-term vision including a responsible management of ecosystems, it becomes easier to translate this vision into concrete planning initiatives. The sections which follow will focus on medium-term planning and implementation. To this end, a set of tools and approaches will be explored to help capture and include the role played by ecosystem goods and services into the planning process.

Box 23: CBD 2010 Targets

Focal Area: Maintain goods and services from biodiversity to support human well-being

Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods.

Target 8.1: Capacity of ecosystems to deliver goods and services maintained.

Target 8.2: Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.

Focal Area: Protect traditional knowledge, innovations and practices

Goal 9 Maintain socio-cultural diversity of indigenous and local communities.

Target 9.1 Protect traditional knowledge, innovations and practices.

Target 9.2: Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit sharing.

Source: SCBD

Table 7: Examples of MEA		
Name	Total signatory parties	Objective
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), 1971	159	Ramsar seeks to ensure the sustainable, wise use of wetland resources including designation of wetland sites of international importance and to ensure that all wetland resources are conserved, now and in the future.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	175	The Convention seeks to control the trade in species of wild animals and plants that are, or may be, threatened with extinction as a result of international trade.
United Nations Framework Convention on Climate Change, 1992	192	The objective of the treaty is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
Convention on Biological Diversity, 1992	192	The Convention aims at the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources (including appropriate access to those resources and the transfer of relevant technologies, taking into account all rights over those resources and technologies), and to provide for appropriate funding.
Convention to Combat Desertification, 1994	193	The objective of the UNCCD is to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective action at all levels, supported by international cooperation and partnership arrangements, in the framework of an integrated approach.



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SECTION 3 SUMMARY		
Concept/Issues Overview	Definition/Details	Some Facts/ Recommendations
Good Environmental Governance	<p>Environmental governance is more complex than governance linked to the usual socio-economic sectors.</p> <p>Stronger environmental governance in the natural resource sectors is critical to ensure that (a) these sectors contribute optimally to future development, and (b) economic development does not come at the cost of ecosystem degradation.</p> <p>Three main factors can shape the management of natural resources and governance-related arrangements:</p> <ol style="list-style-type: none"> 1. The characteristics of natural resources (water, minerals, timber, etc.); 2. The actors involved (private and the public, business and consumers, as well as poor local communities and Indigenous Peoples); 3. The institutional framing and rules (Role of ministries and government institutions). 	<p>► Poverty Reduction Strategy Papers (PRSPs) of Uganda and Honduras, among others, have begun addressing issues of access and control of natural resources.</p> <p>Poor governance can be characterized by unbalanced or narrow application of governing powers, whereby decisions on ecosystem uses are not accountable to poor communities, and corruption and vested interests reinforce the marginalization of the poor.</p> <p>Many government bodies from municipal to national levels can find direct and indirect benefits when factoring ecosystem goods and services in their respective plans and decision-making.</p> <p>In the absence of adequate land rights, enforcement and incentive measures, conflicting needs can arise resulting in competition between different users of the same services with certain elite groups monopolizing their access.</p>
A Sustainable Development Vision	<p>Building political support for an environmental vision is key to protecting the interests and needs of future generations.</p> <p>A National Sustainable Development Strategy (NSDS) can be reinforced by establishing long-term development objectives that include a focus on green issues.</p>	<p>► Ecological dimensions are included in the NSDS of various countries such as the Enhanced Philippine Agenda 21</p> <p>Within NSDS priorities, governments and stakeholder can include the role of ecosystems as a clearly visible objective. Attention to EGS issues at a high level of strategic government planning can provide the necessary political support to integrate greener and pro-active measures in policies and other sector objectives.</p>
Green Constitutions and Legal Initiatives	<p>A national long-term development vision is enhanced by including green values and objectives under the country's Constitution/ Charter.</p>	<p>► Countries such as Ecuador and Bhutan have taken the step to include environmental dimensions in their respective constitutions.</p>
Global Environmental Commitments	<p>Multilateral Environmental Agreements (MEA) generally reference biodiversity conservation and associated ecosystem services. This dimension is increasingly reflected in MEAs as a complementary means to address poverty reduction, gender mainstreaming and human rights issues.</p>	<p>► There are close to 100 Multilateral Environmental Agreements.</p> <p>At the national level, commitments to comply with Multilateral Environmental Agreements can provide financial opportunities and mechanisms to help establish EGS based development measures.</p>

4 Planning for Sustainability

Guiding Questions for Policy Makers :

- What main ecosystem services does the country's economy rely on?
- How does the proposed policy/strategy depend on ecosystem services?
- How does the proposed policy/strategy alter the indirect and direct drivers affecting these ecosystem services? What will be the impact of the change in drivers on the ecosystem services?
- What is known about the status and trends of these services?
- Under what conditions is it be appropriate to quantify the economic and societal values of ecosystem services? What methods are available to estimate these values? How would economic development and human well-being be affected by a decline in the quality and delivery of ecosystem services and, conversely, what opportunities do ecosystem services provide to improve economic development and human well-being? How would different stakeholder groups be affected?
- How can future changes in ecosystem services be explored?
- How can ecosystem service risks and opportunities be incorporated into the development strategy?
- What policies can help sustain ecosystem services?
- What capacity development is needed?
- Have important ecosystem services been mapped?
- Are the quantity and quality of ecosystem services being monitored?

Source: OECD 2008

4.1 Ecosystem Goods and Services Assessment and Valuation

The environment sector cuts across a broad swath of society and the economy. Poverty reduction, human-induced natural disasters, environmental degradation and economic development require governments to explore how planning processes can be improved to effectively incorporate tangible and non-tangible EGS. Governments would benefit from assessment and valuation techniques capable of highlighting EGS' full contributions to development. Many traditional approaches to cost/benefits analyses target investments in sectors such as health and education, and more rarely the environment. The role and value of the goods and services linked to ecosystems is poorly captured by markets, thus limiting their overall understanding and integration within policies.

Market Price < Ecological Price

The identification and valuation of EGS provide a practical understanding of the socio-economic role of ecosystems and biodiversity in terms of human and development needs. Identification and valuation of EGS can be generally achieved by conducting qualitative and quantitative assessments as specified in figure 8.

For instance the annual value of some EGS have been estimated as follows (UNEP 2007):

- World fish catch – US\$58 billion (provisioning service);
- Anti-cancer agents from marine organisms – up to US\$1 billion/year (provisioning service);
- Global herbal medicine market – roughly US\$43 billion in 2001 (provisioning service);
- Honeybees as pollinators for agriculture crops – US\$2–8 billion/year (regulating service);
- Coral reefs for fisheries and tourism – US\$30 billion/year (cultural service).

Taking into consideration emerging EGS knowledge and available tools, the valuation exercise can in many cases remain a rough approximation of what the total value (see Figure 8) represents. There is the risk of excluding future and unknown costs or uses of EGS and of course the uncertainty about the value that future generation will attribute to ecosystems. However, attributing a value to an ecosystem service provides a starting point to integrate EGS within existing policy and budget processes.

Thus, by taking stock of what is nationally available in terms of EGS, a valuation can contribute to a better understanding of environmental

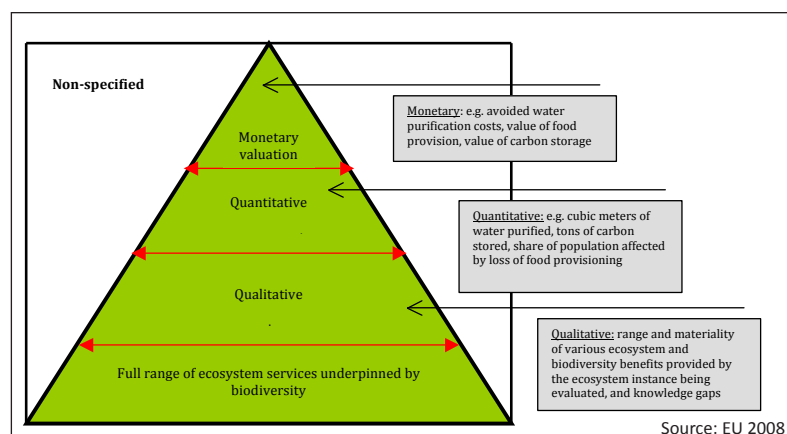


Figure 8: Valuing Ecosystem Services



Box 24: Data for values of different services

The TEEB report analyzes a large number of economic values that have been estimated for the main types of ecosystem services around the world, making use of existing databases and valuation literature.

It aims to provide a synthetic picture of values for different services in different regions and socio-economic conditions (population density, income level), in order to build an information pool for future assessments. This data collection and analysis places the values in their context, thereby facilitating their interpretation and use, notably through benefit transfer.

Over 1,100 values have been collected so far, covering 10 biomes and 22 ecosystem services. These are being organized based on geographical and socio-economic criteria. Work is still ongoing and will be completed in 2010.

Source: EU 2009

contributions to various sectors. It becomes possible to identify what key services exist, their condition and potential for development. The final result can lead to the gradual consideration of environmental externalities that *escape* traditional economic approaches. Following this exercise, it becomes possible to develop pro-active policies based on a better knowledge of a country's EGS. In this sense, EGS assessment and valuation can provide the proper justification for integrating biodiversity and ecosystems within policy and planning processes.

EGS assessment and valuation can help bridge environment and economic sciences. For instance, Standard National Accounts (SNA) can suffer from major limitations when it comes to measuring natural capital. It recognizes depreciation for human-made capital assets but not the 'wear and tear' of ecological assets, which is just as real. This gap is one of the main reasons why natural capital losses remain largely hidden from policy makers and from the corrective power of public scrutiny (EU 2009). EGS assessment and valuation provide a means to compare the benefits linked to ecosystem goods and services in monetary terms and to weigh them relative to other development choices. The comparison of green development policies to mostly economic development scenarios becomes feasible.

We can summarize the justification to integrate EGS into decision-making through the following four main reasons: First, sustainable use of natural resources is critical to sustainable economic development in most low-income countries. Second, there are clear

Box 25: World Resources Institute Ecosystem Services Approach

Step 1: Identify the Ecosystem Services in Play

The first step is to identify all the ecosystem services that a decision depends on and affects. It involves systematically considering whether or not the decision depends on or has an impact on each ecosystem service.

Step 2: Screen the Ecosystem Services for Relevance

The second step entails screening the ecosystem services identified in step one to determine which are most *relevant* to the decision in order to set priorities for further assessment.

Given limited resources, a decision maker may not be able to assess in detail all the ecosystem services that a decision depends on and impacts. This step will also inform what geographic (spatial) and time scales to include in the decision making process, as well as identify other users of the services that may affect or be affected by the decision.

Step 3: Assess the Condition and Trends of the Relevant Ecosystem Services

The third step involves conducting a more detailed analysis of the condition of the ecosystem services selected in step two and their trends. The resulting information will be used in the final step to identify the ecosystem service-based risks and opportunities associated with the decision.

Step 4: Assess the Need for an Economic Valuation of Services

Economic valuation is the attempt to assign quantitative economic values to ecosystem services, including services that are at least partially captured by the market (such as provisioning and some cultural services) and those that are not currently valued in the marketplace at all (for instance, regulating services).

Step 5: Identify Ecosystem Service Risks and Opportunities

Identifying the ecosystem service-related risks and opportunities associated with a decision involves using the information gathered in earlier steps. Step five can also draw on the results of any scenarios that explore how ecosystem services may change in the future.

Risks and opportunities can relate to both the dependence of the decision's goals on ecosystem services and how the decision affects services that other stakeholders rely on.

Source: Ranganathan *et al.* 2008

indications of environmental degradation with direct impacts on health, security and productivity. Third, policy makers lack sufficient economic information on the links between the environment, economic development and poverty reduction. Fourth, integration of the environment in key policy processes and budgets remains low, despite advances in environmental legislation (Drakenberg *et al.* 2009). As a result, public policies can set the stage for new markets capable of integrating ecosystem service values where possible into price signals.

There is no one recipe to conduct such an assessment, but the *Ecosystem Services Approach* presented below is one of the available measures to be taken in view of assessing and valuing ecosystem services. It is suggested by the World Resources Institute and can be implemented through the following steps (see box 25 and Table 8).

The approaches below represent potential EGS valuation techniques (Ecosystem Valuation n.d.):

1) Market Price Method:

Estimates economic values for ecosystem products or services that are bought and sold in commercial markets.

2) Productivity Method:

Estimates economic values for ecosystem products or services that contribute to the production of commercially marketed goods.

3) Hedonic Pricing Method:

Estimates economic values for ecosystem or environmental services that directly affect market prices of some other good. Most commonly applied to variations in housing prices that reflect the value of local environmental attributes.

4) Travel Cost Method:

Estimates economic values associated with ecosystems or sites that are used for recreation. Assumes that the value of a site is reflected in how much people are willing to pay to travel to visit the site.

5) Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods:

Estimate economic values based on costs of avoided damages resulting from lost ecosystem services, costs of replacing ecosystem services, or costs of providing substitute services.

6) Contingent Valuation Method:

Estimates economic values for virtually any ecosystem or environmental service. The most widely used method for estimating non-use, or “passive use” values. Asks people to directly state their willingness to pay for specific environmental services, based on a hypothetical scenario.

7) Contingent Choice Method:

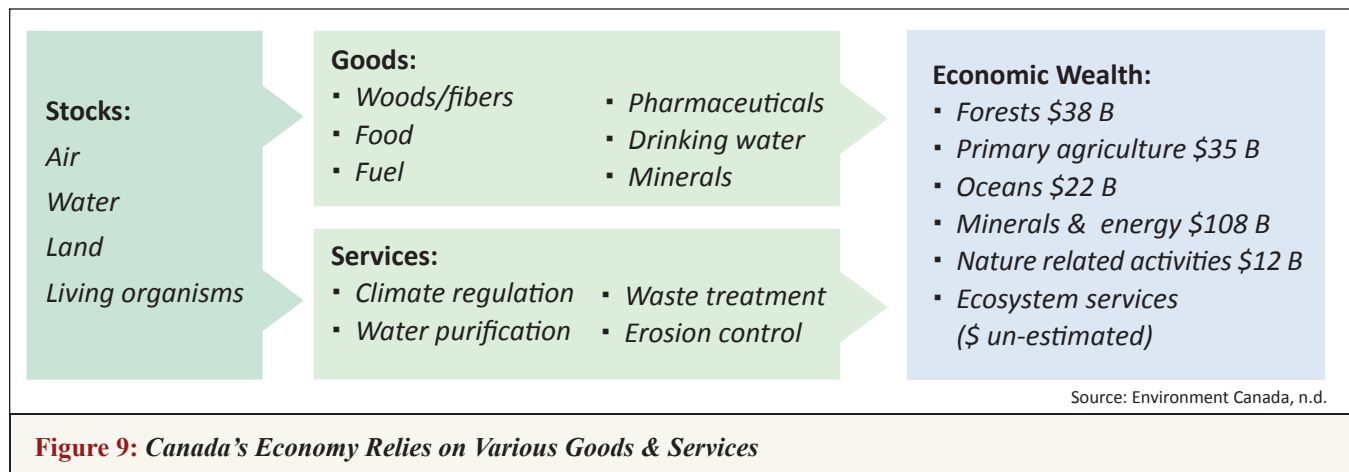
Estimates economic values for virtually any ecosystem or environmental service. Based on asking people to make tradeoffs among sets of ecosystem or environmental services or characteristics. Does not directly ask for willingness to pay—this is inferred from tradeoffs that include cost as an attribute.

8) Benefit Transfer Method:

Estimates economic values by transferring existing benefit estimates from studies already completed for another location or issue.

National and sub-national policies and plans	<ul style="list-style-type: none"> ▪ National budgets ▪ National development policies ▪ Climate adaptation
Economic and fiscal incentives	<ul style="list-style-type: none"> ▪ Subsidies ▪ Tax policies to promote sustainable technology ▪ Payments for ecosystem services
Sector policies and plans	<ul style="list-style-type: none"> ▪ State of the environment reports ▪ Land use zoning ▪ Technology transfer
Governance	<ul style="list-style-type: none"> ▪ Freedom of information ▪ Participatory decision making

Source: WRI 2008



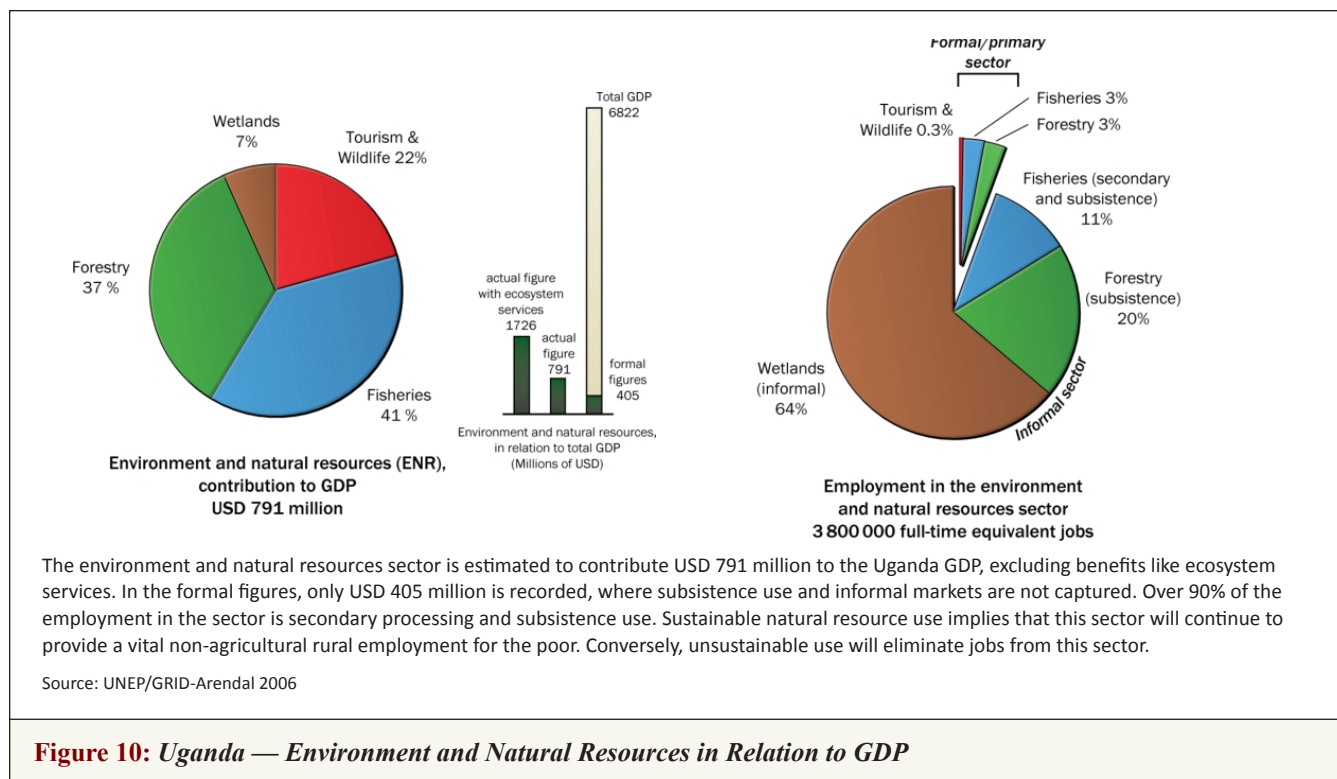


Figure 10: Uganda — Environment and Natural Resources in Relation to GDP

4.2 Approaches for Integrative Planning Processes

Examples of current and potential ecosystem goods and services (see box 26) that nature provides to society and to the economy are multiple. They come in tangible and non-tangible forms, and in financial and non-financial forms. There are many challenges which serve to hide a great part of these benefits from policy makers. From a governance perspective, the beneficiaries of ecosystem goods and services depending on natural capital often form a different constituency from those who would benefit from liquidation of the natural capital. The cross-cutting, trans-boundary and trans-generational characteristics of environmental management contributes a level of complexity different from conventional sector policies. For instance, as markets fail to capture the role of ecosystems and their complexity, perspectives on the environment continue to be fragmented and dominated by the activities and priorities of more prominent sectors (agriculture, forestry, health, etc.). More particularly, markets typically reward short-term values of natural resources while underestimating or not capturing the real EGS value. Other challenges relate to communicating environmental concepts without failing to effectively link EGS issues to social and economic dimensions. This remains a difficult task as scientific data on economic and social benefits of ecosystem services can be scarce and the scale usually needed for decision making still too small. In such cases a precautionary approach is recommended in order to prevent future risks and unsustainable development paths.

Policy development and decision making are rarely in the hands of environmental planners, and their influence within government is dependent on resources and the level of responsibilities assigned to the Environment Ministry (agencies or departments).

Box 26: Environmental Benefits – Country Examples

- In Lao PDR, non-timber forest products (food, fodder, building material, medicine, etc.) are estimated to comprise nearly half of rural household subsistence and cash income.
- In Mozambique, public revenues stemming from natural resources could be increased by 165% (equivalent to 15% of fiscal revenues).
- In Peru, the cost of environmental degradation was estimated to be equivalent to 3.9 % of GDP, mainly due to increased mortality, morbidity and decreased productivity.
- In Tajikistan, environmental degradation was identified as a binding constraint to economic growth. National savings were estimated to be minus 6.6 % of GDP largely due to soil erosion, water damage and underinvestment in fixed capital.
- In Uganda, the economic value of fisheries, forestry, wetlands, tourism and wildlife were estimated to be equivalent to 19% of GDP, substantially higher than what is recorded in official statistics.

Source: Drakenberg et al. 2009

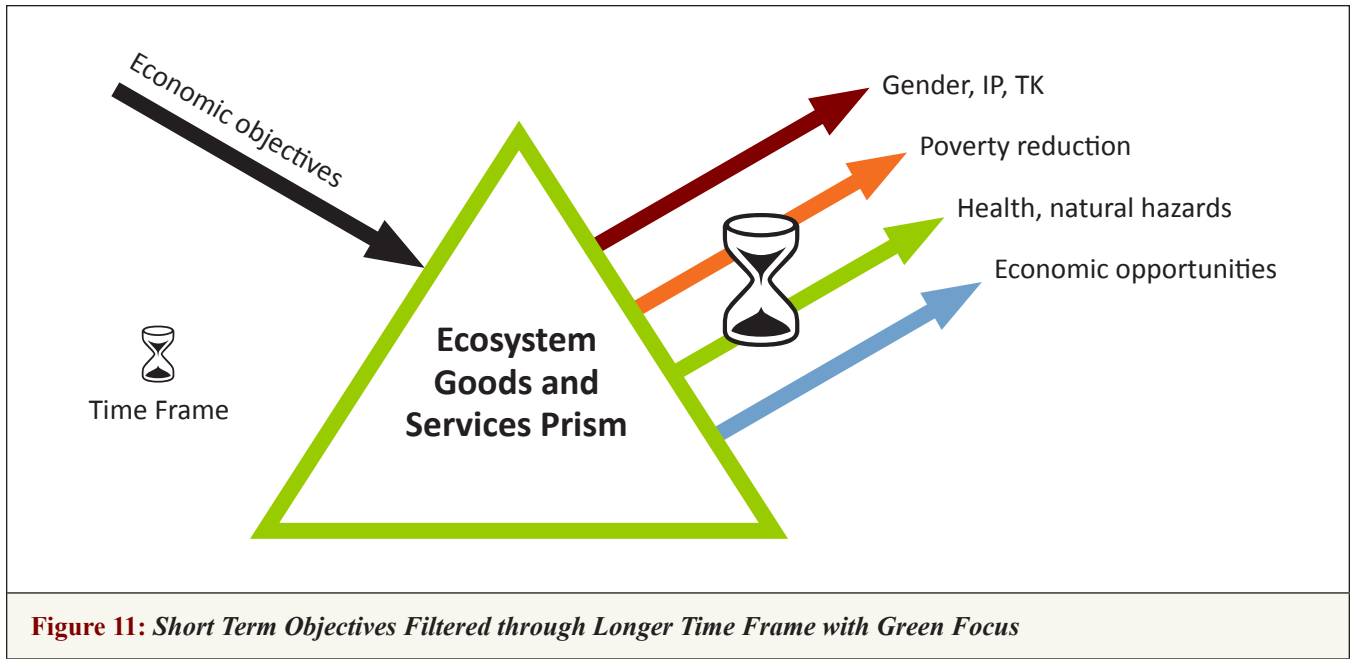


Figure 11: Short Term Objectives Filtered through Longer Time Frame with Green Focus

The above challenges (and others) can reduce the uptake of the role and importance of ecosystem goods and services within policy and planning processes. The result can be a lack of clear consensus and consistent measures about adoption of EGS-based approaches. For instance the National Biodiversity Strategy and Action Plan (NBSAP) or similar plans related to other Multilateral Environmental Agreement (MEA) are implemented without their effective integration in broader development plans. Instead, many countries still rely on environmental policies that are mostly geared towards responsive measures dealing with pollution control and abatement. But how to consider EGS-based benefits, and *limits* as an essential and complementary socio-economic motor for development? How to include pro-active environmental measures, taking into consideration that policy-making, and decision-making can be non-linear? There is no one answer. It is therefore important to target various levels of planning processes and to identify mechanisms where green initiatives could be introduced. In general, countries rely on three planning approaches to turn development policies into concrete actions: sector plans, decentralized plans, and spatial plans.

The extent to which these approaches are effectively adopted and implemented can vary from one country to another. However, most of these plans do not adequately integrate green and pro-active objectives. Policy makers can access a variety of approaches/tools to mainstream EGS into national development strategies, and within poverty reduction strategies. The sound integration of the environment allows government planners to acquire a *360 degree planning vision*, assessing spatial and temporal changes to ecosystems, their availability, and use. Environment as a systemic filter allows plans to target multiple topics such as gender and Indigenous Peoples' needs, education, natural disasters, health and food security (see Figure 11). Reconciling short-term economic interests and long-term development needs can be achieved by linking sustainable ecosystem management and EGS into planning. Assessing the state and capturing the value and role of ecosystem goods and services can lead to truly integrated planning approaches resulting in a better equity and sustainability. This leads to the elaboration of enhanced national development strategies or poverty reduction strategies that are pro-active and inclusive of EGS dimensions.

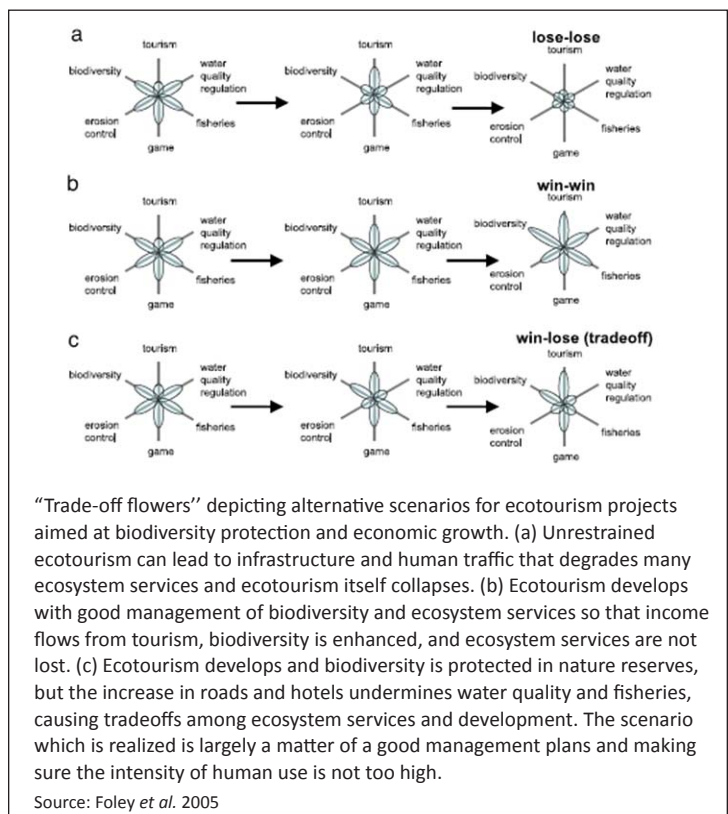


Figure 12: Scenarios for ecotourism projects aimed at biodiversity protection and economic growth



4.2.1 Sector Plans

Ecosystem services are often required to meet diverging sector goals. Conflicting sector priorities, coupled with a need to achieve rapid economic returns, can *obscure* the importance of maintaining environmental sustainability. For instance the agriculture, forest, water or fisheries sectors often pursue competing objectives such as the production and exploitation of a resource and its protection for long-term use. In order for a sector to thoroughly integrate environmental dimensions into their sector's objectives and impact analyses, a strong understating of the objectives and impacts of others sectors is required. In this sense sector plans should internalize in their strategies, their long-term dependence and impact on nature resources. Focus should be on understanding the type and value of tangible and non-tangible services that ecosystems can contribute to sustainably meeting sector and other national goals. Sector strategies which consistently account for EGS inputs and outputs in production systems and their impact on security and human well-being optimize their chances of long term success. For instance, mounting climatic uncertainties and natural threats are examples of challenges to be considered as policy makers adapt their strategies to preserve ecosystems' resilience. Thus, governments should look at greener, pro-active and joint approaches to sector strategies. This is achieved through an integrated look at ecosystem goods and services based on harmonized sector policies (see Figure 12).

Box 27: Reduced Impact Logging (RIL)

Reduced Impact Logging (RIL) can provide both environmental and economic benefits. Studies have found that RIL can be used to reduce carbon emissions by up to 40 tons per hectare of forest when compared to conventional logging. The preservation of higher levels in biodiversity in selectively logged forests lends a strong case to sustainable forest management over standard timber harvesting techniques. Apart from the environmental benefits, RIL has been shown to reduce the percentage of 'lost' logs (those trees that are felled in the forest but not extracted because they are not seen by tractor operators), thereby reducing timber wastage. Damage to the forest ecosystem can be tremendously reduced by adopting certain RIL practices including:

- Directional tree felling to inflict the smallest impact on the surrounding forest;
- Cutting climbers and lianas well before felling;
- Establishing stream buffer zones and watershed protection areas;
- Using improved technologies to reduce damage to the soil caused by log extraction;
- Careful planning to prevent excess roads which give access to transient settlers.

Source: SCBD 2009

Box 28: South Africa – Working for Water Programme

Invasive alien species are causing billions of Rands of damage to South Africa's economy every year, and are the single biggest threat to the country's biodiversity. Invasive alien species are plants, animals and microbes that are introduced into countries and then out-compete indigenous species. Invasive alien plants (IAPs) pose a direct threat not only to South Africa's biological diversity, but also to water security, the ecological functioning of natural systems and the productive use of land. They intensify the impact of fires and floods and increase soil erosion. IAPs can divert enormous amounts of water from more productive uses and invasive aquatic plants such as the water hyacinth affect agriculture, fisheries, transport, recreation and water supply. Of the estimated 9000 plants introduced to South Africa, 198 are currently classified as being invasive. It is estimated that these plants cover about 10% of the country and the problem is growing at an exponential rate. The fight against invasive alien plants is spearheaded by the Working for Water (WfW) programme, launched in 1995 and administered through the Department of Water Affairs and Forestry. This programme works in partnership with local communities to whom it provides jobs, and also Government departments including the Departments of Environmental Affairs and Tourism, Agriculture, Trade and Industry, provincial departments of agriculture, conservation and environment, research foundations and private companies.

Since its inception in 1995, the programme has cleared more than one million hectares of invasive alien plants providing jobs and training to approximately 20,000 people per annum from among the most marginalized sectors of society. Of these, 52% are women. WfW currently runs over 300 projects in all nine of South Africa's provinces. Scientists and field workers use a range of methods to control invasive alien plants. Other EGS benefits will accrue relative to increased water availability and food security.

Source: Government of South Africa

There is a triple challenge for sustainable planning of sector policies:

1. **better ecological balance** between the sectors and the environment (reduced ecological footprint, sustainable and efficient use of ecosystem services) by investing in ecosystem resilience and productivity;
2. **better inter-sectoral and spatial distribution** to generate the optimal sectoral outcomes for sustainable development, poverty reduction and risk prevention (production within ecological limits) by investing in ecosystem resilience and productivity;
3. **better socio-cultural balance** through improved distribution of benefits, more equitable access to vital ecosystem services among the different segments of society, and consumption within ecological limits.

Conventional government structures dictate that some environmental dimensions can be handled by ministries with activities related to natural resources (e.g. ministries of agriculture, forestry, fishery, mining, water, etc.). In the absence of a clear understanding of ecosystem benefits, ministries can quickly overlook some of their environmental priorities. When possible, an Environment Ministry should regularly engage other sectors to help them pro-actively integrate environmental dimensions. This approach will have the following benefits:

1. Understanding the thresholds of ecosystems and their resilience levels;
2. Capturing and optimizing benefits from ecosystem goods and services;
3. Harmonizing and integrating the different sector strategies in terms of their use of common ecosystem goods and services;
4. Identifying mitigation measures to reduce the ecological footprint.

This implies building sound scenarios and options about how EGS can contribute to the success of other sector strategies. It requires new flexibility in the process of preparation and implementation of sector strategies to allow adequate room for environmental input and a gradual consideration of ecosystem-based approaches. An Environment Ministry can offer its cooperation to other sectors in terms of sustainable practices to be adopted while gaining sector support for green programmes. National Biodiversity Strategies and Action Plan (NBSAP), along with similar tools of other Multilateral Environmental Agreements, can provide strategic guidance in developing green sector plans.

Box 29: National Biodiversity Strategies and Action Plans — NBSAPs

A National Biodiversity Strategy and Action Plan is the main tool for the implementation of the Convention on Biological Diversity. Article 6 of the Convention on General Measures for Conservation and Sustainable Use states that each Contracting Party shall, in accordance with its particular conditions and capabilities:

- Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, *inter alia*, the measures set out in this Convention relevant to the Contracting Party concerned;
- Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

Integrating the dimensions of conservation and sustainable use of biological resources into national decision-making is a complex challenge that is at the heart of the Convention. At the country level, effective development and implementation of an NBSAP has faced obstacles such as a lack of technical capacities, environmental data, and political will. While NBSAPs are key documents in terms of gathering conservation information and identifying best implementation measures, in general their contribution to the elaboration of national development policies and other sector strategies has been rather limited.

NBSAP Benefits

To date over 160 countries have developed NBSAPs. Their implementation can serve a variety of purposes, including:

- Assessing the status and trends regarding biological diversity (including the laws, policies, institutions, and conservation initiatives);
- Identifying environmental problems and constraints linked to ecosystems and biodiversity;
- Establishing policies, strategies, and actions required to effectively meet the objective of the CBD within specific timeframes;
- Identifying steps to mainstream biodiversity within development sectors.

The SCBD is currently working on the development of an updated NBSAP framework focusing more directly on development and poverty reduction.



Systemic and trans-disciplinary thinking and cooperation are needed in the development of sector policies and plans to highlight the state of EGS, their value and role in development. Based on such an assessment, potential benefits and constraints can be determined according to sector activities. Various policy development mechanisms for understanding the use and management of environmental resources can be available. For instance, as environmental programming reaches beyond the functions of an Environment Ministry, integrating environmental programmes and units within various sectors can rebalance certain development decisions that are based on pure economic goals (Luttrell and Pantaleo 2008). Opportunities for strategic dialogue can be found through multi-stakeholder platforms (e.g. sector working groups and sectorwide approaches (SWAp)), which can contribute towards enhancing environmental coordination and planning the common use of ecosystem resources. These platforms are a space where an Environment Ministry and other groups (environmental NGOs, research institutes, academia, and others) need to be present to add their expertise to pro-active planning. Sector Working Groups (SWG) are suggested as a mechanism for fostering multi-stakeholder policy dialogue and coordination. Several countries (e.g. Uganda, Tanzania, Mozambique, Ghana, Nicaragua and Vietnam) have active SWG structures involving a wide range of civil society organizations, private sector entities and development partners (Palerm, Ledant and Brinn 2006). They help address conflicting objectives, increase multi-sector ownership, and align policy within national development and poverty reduction strategies. They can reduce transaction costs linked to redundancies in environmental planning measures and inefficient consultation processes undertaken independently by each sector.

Table 9: Comparison Between SWAp and Conventional Project Approaches

SWAp	Conventional project approach
Country-wide holistic view on entire sector	Focus on projects to support narrowly defined objectives
Partnership with mutual trust and shared accountability	Recipient accountable to donor
External partner coordination and collective dialogue	Bilateral negotiations and agreements
Increased use of local procedures	Parallel implementation arrangements
Long-term capacity/system development in Sector	Short-term disbursement and success of projects
Process-oriented approach through learning by doing	Blueprint approach

Source: UNCCD 2007

4.2.2 Spatial Plans

The process of greening sector plans relies on the use of spatial approaches. The issue of scale is paramount in ecosystem management. Inevitably, there are geographical mismatches between social institutions and natural processes. The challenge is in finding an approach that can best complement both scales. This means developing an effective interface between spatial and sectoral planning, whereby land-use characteristics are integrated and considered at sub-national and national levels. Through land-use planning, policy makers are capable of integrating temporal and spatial dimensions into development decisions, while taking into consideration all benefits and role of ecosystem goods and services (Petersen and Huntley 2005). Land-use planning provides policy makers with a look at trade-offs in development projects, their impacts on common natural resources and the livelihoods of concerned communities within specific geographical boundaries. Land-use planning is one component of policy development where environmental mainstreaming can add significant value (Blanco *et al.* 2008). It compensates for rudimentary planning approaches that fail to account for the cumulative impacts of combined sector planning and how these can degrade ecosystem benefits. This is important as transforming landscapes requires a good understanding of the linkages among neighboring ecosystems. Planners can evaluate the potential impact of land-use decisions by looking at current needs and the cumulative effects of sector plans on system-wide ecosystem degradation. Spatial planning should provide an opportunity for multi-stakeholder collaboration to express its views and interests on resource use. In light of common needs and EGS knowledge, private sector and community objectives can be better integrated according to their common dependence on ecosystems.

Box 30: Example of Land-use planning Benefits

Land-use planning aims to make the best use of limited resources by:

- Assessing present and future needs and systematically evaluating the land's ability to supply them;
- Identifying and resolving conflicts between competing uses, between the needs of individuals and those of the community, and between the needs of the present generation and those of future generations;
- Seeking sustainable options and choosing those that best meet identified needs;
- Planning to bring about desired changes;
- Learning from experience.

Source: FAO 1996

Spatial plans visualize the interface between ecosystems, their productivity in terms of delivery of EGS, and the demographic-geographic development needs including the goals of socio-economic sectors. Spatial planning, in its holistic manner, can be inspired by the ecosystem approach (see box 31). The latter is the primary framework for action under the Convention on Biological Diversity and has been introduced and promoted by a number of international organizations as an effective way

Box 31: Ecosystem Approach

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. [...] It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.

Source: Shepherd 2004

The 12 principles of the Ecosystem Approach (Malawi principles)

- Principle 1: The objectives of management of land, water and living resources are a matter of societal choices
- Principle 2: Management should be decentralized to the lowest appropriate level.
- Principle 3: Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
- Principle 4: Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should: a. Reduce those market distortions that adversely affect biological diversity; b. Align incentives to promote biodiversity conservation and sustainable use; c. Internalize costs and benefits in the given ecosystem to the extent feasible.
- Principle 5: Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.
- Principle 6: Ecosystem must be managed within the limits of their functioning.
- Principle 7: The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
- Principle 8: Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
- Principle 9: Management must recognize the change is inevitable.
- Principle 10: The ecosystem approach should seek the appropriate balance between, and integration of conservation and use of biological diversity.
- Principle 11: The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
- Principle 12: The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

(Extract from the website of the Convention on Biological Diversity; <http://www.cbd.int/ecosystem/>)



Flickr.com/Pati Gaitan



of managing ecosystems. Spatial plans have the potential to link human and ecosystem dimensions across space and time taking into consideration the ecosystem management needs and contributions of stakeholders (see box 32). However, as the ecosystem approach continues gaining interest, many challenges remain. From an administrative perspective one of the challenges is the incompatibility between ecosystem boundaries and political borders, thus requiring the involvement of various government authorities. At the sub-national level this requires coordination between local governments of neighboring municipalities or districts and at the international level it requires trans-boundary management of natural resources or ecosystems.

The ecosystem approach is also important when looking at risks of natural disasters. The Millennium Ecosystem Assessment (2005) produced clear evidence that ecosystems such as coral reefs, mangroves, wetlands and mountain forests are all important in mitigating the impact of natural hazards. The complexity of ecosystem functions and their contribution to natural stability and human well-being need to be captured in disaster planning strategies. Although our understanding of these systems is still limited, there is presently enough evidence for planners to push for preventive and pro-active measures promoting ecosystem-based approaches. Including these aspects in disaster planning can assist in limiting costs linked to ecosystem restoration and to the reconstruction of damaged physical structures (see box 33).

Box 32: Indonesia — Papua Province, Participatory Rural Appraisal

Papua is Indonesia's last great reserve of untouched forest. Its forests account for approximately 24 percent of Indonesia's total forested area and are rich in biodiversity. Recently, traditional forest-dwelling communities and government forestry officials have been finding ways of looking at their common interests — environmental protection, sustainable forest management and sustainable livelihoods — from the perspective of the ecosystem approach. They have been supported by local NGOs and by a Multi-stakeholder Forestry Programme funded by the British government. The programme works in both lowland and highland forests. Negotiation of jointly agreed, environmentally benign land-use began with the decision by local people to map both their clan boundaries and the varieties of natural resources and use areas within them. These clan maps, when compared with the Forest Department's land classification maps, immediately revealed anomalies that required urgent resolution. In lowland areas, where a great deal of forest is designated for production and conversion, it was clear that clan land-use valued ecosystem structure and function more highly than did government. In highland areas, clans had, in addition to their agricultural lands, a seven-zone classification of forest, with different kinds of use, management and protection attached to each zone. The Forest Department classified the entire area, thousands of square kilometers, as a national park. Four ecosystem areas were selected in 2004, with the help of forestry and clan maps. Forestry officials stayed for a week with villagers in each area, and took part, with them, in a specially-designed forest-focused exercise in Participatory Rural Appraisal (PRA). Villagers had the chance to explain ecosystem structure and function to government from their point of view and to analyze problems. They described the evolution of the ecosystem over about 40 years, and took officials on transect walks across both forest and agricultural land, explaining management rules and techniques. In subgroups that gave women and younger men a voice, they analyzed livelihood sources (both cash and subsistence) drawn from the ecosystem, and identified key landscape and social trends. They also identified problems and possible solutions, indicating which problems they felt they could handle themselves, and which required outside help. The PRAs revealed the strength of local people's land-management skills and decision-making institutions, and created opportunities for renegotiating land-use. Although each side had been fearful of working together, the joint exercises opened lines of communication and built new trust, respect and insight. Plans for jointly designed sustainable forest management, and for a more fine-grained patch-by-patch approach to conservation, are now underway.

Source: Shepherd 2004

Box 33: Indonesia — Taking steps to integrate environmental and disaster risk reduction policies

Recognizing Indonesia's vulnerability to hazard events and disasters, the 2006-2009 National Action Plan for Disaster Risk Reduction was launched. This important document (also backed up by legislation via the Disaster Management Law No. 24 of 2007) makes repeated mention of the importance of ecosystems and a healthy environment in disaster risk management and reduction. Ecosystem degradation is recognized as one of the major factors that interact to cause disasters, and the Plan itself includes a series of actions to encourage the sustainable use and management of ecosystems. It demands that "Regions that depend themselves on extractive industry and exploitation of natural and environmental resources are expected to equally invest in the efforts of mitigation, preparedness, response and recovery from disaster impacts that have been or may be caused by those activities". The plan specifically calls for natural resource protection and zoning in coastal and sea areas.

Source: Sudmeier-Rieux Karen and Neville Ash 2009

There are three requirements for disaster risk reduction strategies to be effective (Sudmeier-Rieux 2006):

1. Being mainstreamed into development planning;
2. Being multi-sectoral;
3. Investing in ecosystem management.

For decision makers to study and evaluate different spatial plans and related sector development scenarios, Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA) and community mapping, are strategies and tools that can help visualize and integrate at different scales environmental, and socio-economic information across time and space.

Strategic Environmental Assessment (SEA) as a holistic and systemic approach favors the pro-active consideration of environmental issues in planning and decision making. It allows for the evaluation of cumulative environmental impacts of Policies, Plans and Programs. Strategic Environmental Assessment approaches are particularly useful in the context of Sector wide approaches (SWAs), whereby donors align their support behind a specific sectoral plan (e.g. transport, energy, health, water supply etc.). SEA seeks to capture positive environmental potentials — identifying environmental factors critical to a plan's long-term success. For example, a plan to develop the forestry sector must take explicit account of both the wide range of environmental goods and services which forests provide, and the environmental impacts and sensitivities associated with different forestry development options. The OECD and other Environmental Assessment organizations are increasingly promoting the introduction of the EGA-approach within SEAs. This view can help reinforce the implementation of development plans as they effectively integrate ecosystem dimensions based on their benefits to human needs. However, the SEA community has to date rarely used the opportunities provided by the ecosystem services concept to translate environment into societal benefits. Despite serious efforts to identify good SEA case material, only few SEA cases are available with a clear recognition of ecosystem services (Slootweg R. and Pieter Van Beukering 2008).

Box 34: South Africa — Strategic Environmental Assessment

An SEA has been carried out for the planning of open space in UMhlatuze, a rapidly developing and urbanising municipality in South Africa. River catchments provided an effective environmental entity for assessing synergistic impacts of urban development. A strategic catchment assessment had to provide criteria for measures of protection and planning of development in non-developed lands. It accounted for the balance between supply of environmental goods and services provided by the natural environment and the demand for these goods and services by people. A status quo report of each catchment indicated required management actions where needed. Important benefits derived from ecosystem services included water supply and regulation, flood and draught management, nutrient cycling and waste management; these 'free' ecosystem services provided a calculated economic benefit of R 1.7 billion annually. Monetisation of ecosystem services made decision makers react much more openly to the need for conservation measures.

Source: Kolhoff et al. 2006

Box 35: Ghana — SEA to incorporate Poverty-Environment Linkages into Ghana's Poverty Reduction Strategy Processes

Although Ghana's Poverty Reduction Strategy, published in February 2002, identified environmental degradation as a contributor to poverty, overall the strategy treated the environment only as a sectoral matter. Moreover, many of the policies put forward in the strategy relied on the use of natural resources in ways that held the potential for significant environmental damage.

The government decided to carry out an SEA as part of a poverty-environment mainstreaming effort for a revised Poverty Reduction Strategy. The SEA aimed to evaluate the environmental risks and opportunities associated with the strategy's policies and to identify appropriate measures to ensure that sound environmental management was the basis for poor sustainable growth and poverty reduction in Ghana.

The SEA commenced in May 2003 and comprised two elements: a top-down assessment, with contributions from 23 ministries; and a bottom-up exploration at the district and regional levels. The ministries were exposed to SEA processes and guided on how to incorporate the environment in policy formulation.

Planning guidelines were revised to integrate poverty-environment links at the sector and district levels. Greater emphasis was placed on the use of the SEA to improve the processes by which policies are translated into budgets, programmes, and activities. The SEA also changed the attitudes of officials responsible for planning and budgeting, encouraging them to seek win-win opportunities in integrating the environment in policies, plans, and programmes. The 2006–09 Poverty Reduction Strategy was drafted with direct input from the SEA team.

Source: UNEP-PEI 2009



Finally, among available benefits governments can also consider restoring or rehabilitating deteriorated ecosystems to help regenerate their damaged biodiversity and consequently their lost ecosystem services (see box 36). When mitigation actions (e.g. reforestation, artificial forestation, etc.) are still possible, recuperating some or all of the ecosystem functions can offer new land use scenarios and income generating opportunities. However, it is generally easier and cheaper to address environmental problems early on rather than intervening once damage occurs and subsequently trying to restore degraded ecosystems.

Box 36: Kenya — The Mau Complex — Bring It On Back

The Mau is the largest closed-canopy forest in Kenya generating goods and services worth in excess of 20 billion Kenyan shillings (or over \$320 million) annually for the country's tea, tourism and hydro-power sectors. It is located on the western side of the Rift Valley. The ecosystems not only provide essential water to rivers and lakes in Kenya but also feed Lake Victoria, which is shared with Uganda and Tanzania and is part of the River Nile Basin, and Lake Natron, shared with Tanzania. Water provided by the Mau feeds rivers that nourish major tourist destinations including the Maasai Mara National Reserve and Lake Nakuru National Park - part of a sector that employs a million people in the formal and informal sectors. Over recent years the forest has been impacted by "extensive illegal, irregular and ill-planned settlements as well as illegal forest resources extraction," according to a UNEP assessment. In total over 100,000 hectares or close to a quarter of the Mau Complex has been destroyed in the past decade putting at risk livelihoods, businesses and existing and planned hydropower schemes. Based on UNEP and partners' aerial surveys and recommendations, Kenya has decided to act to reverse the rate of loss and restore the productivity of the Mau ecosystem. The Prime Minister of Kenya formed a Task Force supported by UNEP to assess the measures needed to restore forest ecosystems back to health. Areas of initial action have included establishing effective enforcement and management structure; identifying the legal boundaries; and assessing land ownership in the entire forests ecosystems. Further degradation from logging and encroaching settlements has been contained by Kenya Wildlife Service rangers and forest guards acting with the local authority and administrative police force. A strategic management plan is being prepared along with mapping of biodiversity hot spots and critical water catchments areas. Restoration, including re-establishment of forest plantations, the promotion of natural regeneration and "forest enrichment planting to support natural regeneration", are also planned.

Source: UNEP 2008

4.2.3 Decentralized Plans

Countries have their particular territorial, administrative and political divisions: National, Provincial, District or municipal governments usually have different competencies. Decentralization is one way of getting closer to the implementation level. It is a mechanism to involve local communities in decision-making and to resolve problems closest to their source. Sub-national plans are important components within the development of an overarching national development strategy and vice-versa. Hence, there is a need for a vertical coherence between these different dimensions of decision making. While important, the views of a central government represent one portion of a broader exercise to fully understand ecosystems and the dimensions they represent for development. The benefits of ecosystems are best identified and assessed in terms of their role and importance to direct users (e.g. local communities, industries, business sector). Choices and decisions from a central government can benefit from scientific, local and traditional knowledge. From this perspective, government plans and decisions will highly benefit from the views of the direct beneficiaries of a given ecosystem. Accordingly, knowledge about the state and the role of ecosystems can be recaptured in policies. This participative procedure is also a measure to scale up successful local practices and techniques of sustainable ecosystem management and bridge science and local/traditional knowledge. In a context of economic and political inequity, communities depending on their natural environment for survival can become quickly marginalized. Decentralization can reduce the chances of such inequities, offering a direct opportunity of empowering poor communities for any of their positive contributions. Decentralized planning can also lead to partnerships between communities, the government and other private sector companies. Other benefits may include in an increase in stakeholders' motivation to take part in monitoring and awareness-raising activities. If the beneficiaries of an environmental (or other sustainable) program can be identified, there is a potential for contributions (in terms of both funds and labor) from the relevant communities, with the government acting as a co-financier or credit provider if necessary. This would reduce pressure on public budgets, while enhancing a sense of community ownership of the program (Sheng 1997). Decentralization can also contribute to good governance structures that are more responsive to citizens' demands and that allow the downsizing and streamlining of central government institutions.

One form of a pro-active EGS based approach is delegation of responsibilities and authority to the lowest levels. It is achieved by promoting community-based natural resource management, which can help maintain the viability and services of ecosystems. An approach that is gaining recognition in terms of involving local people is the Indigenous and Community Conserved Areas (ICCAs). Indigenous peoples and local communities, both sedentary and mobile, have for millennia played a critical role in conserving a variety of transformed and natural environments and wild and domesticated species. They have done this for

a variety of purposes, economic as well as cultural, spiritual and aesthetic. There are today many thousand Indigenous and Community Conserved Areas across the world, including forests, wetlands, and landscapes, village lakes, water catchments, rivers and coastal stretches and marine areas. The history of conservation and sustainable use in most of these areas is much older than government-managed protected areas, yet they are often neglected or not recognized in official conservation systems (ICCA n.d.).

Decentralization and local empowerment are not always a guarantee for environmental stewardship. Hence, it is important not to take a romantic view of community empowerment as the panacea for poverty alleviation and environmental protection (World Bank 2002). The importance of promoting stronger decentralization should not signify a total disconnection from central planning. On the contrary, there is a need for a clear definition of the role of local, regional and central authorities to avoid overlaps and to enhance vertical coherence between the administrative levels, and horizontal integration between sector policies. For instance, the development of the Indian National Biodiversity Strategies and Action Plan (between 2000-2003) is one example where local communities were heavily involved in its elaboration but lacked a clear support from central government. The results of this extensive work undertaken by various NGOs were eventually rejected as it lacked the support from central government. Thus, the objective is to combine, whenever possible, a bottom-up and a top-down approach in policy development taking into consideration both the spatial and human dimensions.

Box 37: Tanzania — The Duru-Haitemba Village Forest Reserve

The Duru-Haitemba Forest—located approximately 60 km south west of the town of Babati, in Tanzania— is managed jointly by nine villages as a Village Land Forest Reserve. This 9,020 ha miombo woodland plays a major role in the livelihoods of the villages, mainly through the provision of non-timber forest products. Decision-making is carried out by a village management committee under the authority of the Village Council. It is regulated through written management plans and village by-laws governing forest use and imposing penalties in case of violations.

The Duru-Haitemba Village Forest Reserve was initiated in the early 1990s as a then novel effort to decentralize forest management to the local level, following conflict over the gazettement of the forest as a centrally-managed reserve. Its experience was catalytic in spurring the adoption of community-based forest management legislation and policies in the mid to late 1990s. The Forest Act of 2002 calls for forests to be managed at the lowest possible level of government and provides flexible institutional arrangements for Village Land Forest Reserves. Community-based forest management at the village level in Tanzania effectively legitimizes traditional practices and institutions, giving communities a wide array of flexibility to determine and — most critically to enforce — appropriate rules and management activities. Today, the Tanzanian forests managed at village level show increasingly well-documented positive conservation outcomes and improvements in livelihood conditions.

Source : Borrini-Feyerabend G. et. al. 2008



Flickr.com/Dyl Walters



We should keep in mind that decentralization is not to replace centralism by localism, but to recognize the fundamental role that local communities, indigenous peoples and municipalities play in the national economy and for their ecosystems. Local ecosystems should not be seen in isolation as they are an integral part of the broader national landscape. Therefore, decentralization should be understood as the coherent interaction between the different administrative levels of a country. This allows a better integration and harmonization of policies, plans and programs at national levels, while reducing the chances of conflicting

Box 38: Nepal – Forest and Poverty Leasing public land PRSP

The Hills Leasehold Forestry and Forage Development Project (HLFFDP) aimed at reducing poverty and restoring environmental balance in the Hills of Nepal by leasing small blocks of public forest land to groups of poor households, who would regenerate, protect, manage and utilize them.

At project completion date, 1,773 leasehold forestry groups had been formed, 12,028 households had been included, and a total of 7,457 ha of degraded forest land had been handed over, while the total expenditures amounted to \$12.0 million.

An independent evaluation of the project in 2003 found that the transfer of land with degraded forests to the very poor through renewable 40-year leases can both reduce poverty and reforest the Hills. Impacts on rural poverty and on the environment included: (a) a significant increase in the number of goats and the availability of animal feed and in forage self-sufficiency; (b) a rise in annual household income of between \$270 and \$405 from a variety of sources related to the leasehold forest; (c) an enhancement in household food security and an improvement in the diets of children; (d) a substantial reduction in the time required for the collection of forage and firewood and, as a result, a better rate of school attendance by children; (e) a boost in self-esteem and confidence among women; and (f) a halt to and a recovery from environmental degradation at most leasehold sites, including an expansion in the ground cover, the number of plant species present and the number of trees and tree species.

The usefulness of the concept of leasehold forestry in combating poverty in the Hills of Nepal has now been widely recognized. Government policy has become progressively more supportive of leasehold forestry, and leasehold forestry programmes have been accorded top priority status in the Poverty Reduction Strategy Paper (PRSP) and the Government's Tenth Plan 2002-2007. What started out as a small pilot project in 1989 has become a national programme supported financially by the Government and also by a growing number of donors and backed up by a newly approved leasehold forestry policy.

Source: Brett *et al.* 2004



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objectives in terms of ecosystem management. In many countries, there are strategic planning frameworks at provincial and district levels. Under decentralization, districts and municipalities are more frequently assuming devolved responsibility for sustainable development and are required to prepare and implement their development strategies and plans – increasingly through participatory processes, as in Bolivia. However, the skills and methods to undertake decentralized participatory planning are frequently lacking or weak, and the finances to implement plans are inadequate. Often such plans need to be passed upwards for harmonization and approval at regional and national levels, as in Ghana and Tanzania (OECD 2001).

Green Policy Benefits

- Increasing the level of ownership and success of policies and plans;
- Contributing to good governance (responsive to citizens needs) by involving stakeholders;
- Enhancing visibility of gender and indigenous groups;
- Downsizing and streamlining of central government institutions;
- Scaling up successful local/traditional experiences linked to ecosystem management;
- Enhancing integration and harmonization of policies in terms of EGS;
- Enhancing strategic thinking for sectoral policies by integrating environment in sector policies across time/space;
- Reducing conflicts between stakeholders;
- Creating new policy dialogue forums to share EGS priorities and benefits;
- Enhancing donor aid impacts/opportunities based on improved sector strategies;
- Enhancing environmental integration between sectors contributing to more efficient policies;
- Capturing the economic value of EGS and its importance to sectors;
- Enhancing the role of the Environment Ministry as a bridge between the different sectors;
- Enhancing institutional frameworks through better environmental governance;
- Weighing and taking into consideration potential scenarios based on EGS opportunities;
- Raising the role of environmental issues to national policy dialogue;
- Allowing EGS to contribute in a pro-active manner to policies;
- Enhancing pro-active capacity in assessing EGS impacts/benefits;
- Reducing socio-economic costs of development activities;
- Enhancing understanding about the interdependence of sectors and their strategies relative to shared EGS;
- Identifying innovative income sources related to EGS;
- Reducing conflict between stakeholders by involving systematically vulnerable communities in Development/poverty strategies;
- Enhancing ecosystem resilience and capacity of vulnerable populations to face natural disasters;
- Increasing coordination and alignment of various donor funded programmes and projects with country environmental objectives.

The above three planning dimensions covered (sectoral, spatial and decentralised) provide a solid basis for the development of greener National Development and Poverty Reduction Strategies. However, many other tools and approaches will also be necessary to reinforce this planning integration. For instance, in terms of empowering people, aligning and adjusting sector strategies and securing the necessary financial resources, governments can look at greener budget initiatives and EGS valuation and incentive measures. These are introduced in the part below.

4.3 Measures for Greener Budgeting Processes

Guiding Questions for Financial Planners

- Why should the government be involved in financing environment-related infrastructure?
- How should public environmental financing be organized?
- Are environmental expenditures effective and adequate?
- How should the environmental expenditure performance be evaluated?
- How can EGS provide monetary and non-monetary opportunities to poor and vulnerable groups?
- How can markets be reinforced to capture the value of EGS?
- What are the new revenue opportunities to expand/explore in term of EGS?
- What are the perverse tax incentives with impacts on EGS?
- How to structure public environmental finances to reflect and benefit from EGS?
- What financial incentives can be introduced to reward environmental stewardship?
- What are the costs of restoring degraded ecosystems to recover EGS (if feasible)?



Environmental initiatives require sound governance, policies and, the financial resources to help effectively meet national objectives. To this effect, an Environment Ministry needs to be able to compete for funding equitably in reference to other sector ministries. While policies can be cognizant of the role played by the environment, this understanding often is not necessarily well articulated in budget processes. This is reflected in limited/irregular budget allocations to the environmental field. That the environment is treated as a secondary priority in budget allocation may be explained according to one or more of the following:

1. Environmental priorities and goals have not been clearly defined in many countries;
2. There has been no clear classification of environmental expenditures;
3. The costs and benefits of environmental protection/investment programs often defy quantification and monetization, making it difficult to justify these programs on conventional economic criteria;
4. Many developing countries are faced with serious financial difficulties, which constrain their ability to spend on the environment (particularly on human-made environmental infrastructures).

Source: Sheng 1997

The budget elaboration process can be reinforced to promote the importance of environmental contributions by integrating new financial mechanisms that capture the positive role of ecosystem services. A review of the budget development process represents one of many steps to be considered in terms of increasing environmental resources. It is also necessary to reinforce the capacity of the Environment Ministry to develop integrated and strategic budgets showing ecosystems as a source of benefits both in financial and non-financial forms. The government assessment of environmental expenditures and revenues should be able to factor the wide range of financial opportunities linked to biodiversity and ecosystems and not just the taxes and charges for pollution. Thus, in addition to conventional investments in environmental infrastructure, pollution control and abatement measures, an Environment Ministry and a Finance Ministry can assess where sources of green income exist, and how these can be captured. Some examples of possible sources for further financial benefits are:

- EGS sources of revenue generated at the national level;
- EGS revenue opportunities from international sources;
- Non-market value of EGS;
- Non-use value of EGS;
- Option of reallocating negative subsidies to green investments.

Any decision to limit or reduce environmental funds should be the result of a well thought strategic choice rather than the consequence of a poor understanding of the financial or economic value and benefits of ecosystem goods and services. In many cases, modest but strategically selected public investments which greatly increase the productivity of natural resources yield high rates of return. Targeting such investments in particularly poor areas or at activities of particular importance to the poorest will support pro-poor outcomes. There may, however, be trade-offs. Achieving a proper balance between the most profitable investments and those with the most pro-poor benefits will require a political decision (OECD 2009).

Aid policies have evolved to help donors in coordinating and harmonizing their work with partner countries. Measures are taken to avoid duplications of effort in funding and to help build stronger partnerships between recipient countries and the donor community. Mechanisms such as General Budget Support (GBS) are gaining interest as one of the main aid delivery modalities to support the implementation of PRSPs. However, GBS remains a platform for policy dialogue in which environmental focus is not highly visible (UNEP-PEI 2009). The Paris Declaration on Strengthening Aid Effectiveness (Paris March 2005) represents one of the main steps towards increasing ownership, harmonization, alignment, and mutual accountability between partner countries and donors, while highlighting the importance of environmental issues (e.g. policies, assessment, analysis). There are an increasing number of initiatives to help more effective integration of environment within development cooperation. For instance the European Union Council recently promoted efforts towards the integration of the environment in aid mechanisms (see box 39).

Box 39: EU — Integrating Environment in Development Cooperation

The Council endorses six areas of work for improving environment integration and recommends specific actions in each area:

Area of work 4 — With a view to integrating environment in budget support:

- Including environmental integration in budget support dialogue;
- Increasing the use of SEAs to improve environmental mainstreaming in budget support;
- Identifying key entry points for addressing environmental issues in budget support, including through environmental indicators, monitoring systems, and performance reviews;
- Promoting environmental fiscal reform as a component of general budget support and the inclusion of environmental issues in Public Expenditure Reviews (PERs);
- Strengthening local capacities to undertake SEAs, PERs and environmental fiscal reform.

Source: Council of the EU 2009

The measures presented below should help facilitate the integration of EGS in budget planning. They can also contribute to strengthening the environmental debate and dialogue within aid mechanisms.

4.3.1 Environmental Fiscal Reform

Environmental Fiscal Reform (EFR) represents a set of policy measures linked to natural resources use and/or exploitation. As per the definition of the Organization for Economic Cooperation and Development (OECD), EFR refers to a range of taxation and pricing measures which can raise fiscal revenues while furthering environmental goals (OECD 2005). For many developing countries where nature plays a key role, EFR can provide added financial advantages in the context of sustainability and Poverty Reduction Strategies. Natural resource pricing measures, such as taxes for forest and fisheries exploitation and payment for environmental services, can protect natural resources from degradation that would impact on the poor, while generating fiscal revenues from natural resource use that can be spent on pro-poor investments (OECD 2009). The introduction of these new fiscal measures is an opportunity to generate recurrent environmental revenue and to halt the erosion of natural resources.

Box 40: Examples of Environmental Fiscal Reforms

- Natural resource pricing measures, such as taxes for forests and fisheries exploitation, are relevant for most resource-rich countries – which also tend to be low-income countries.
- Reforms of product subsidies and taxes are applicable to most countries, but particularly energy producing countries where fuel subsidies are often high.
- Cost recovery measures, such as user charges on energy and water, are applicable to most countries but must be implemented carefully to protect the poor.
- Pollution charges are particularly relevant for rapidly industrializing middle-income countries where industrial pollution is a serious problem but administrative capacity is relatively strong.

Source: OECD 2005

Box 41: Morocco — Benefits of Environmental Fiscal Reforms

In Morocco public expenditure on the environment represents investments of 4.3 billion Dirhams (US\$ 0.6 billion) or 0.007% of GDP. In contrast, the cost of environmental degradation has been estimated at 3.7% of GDP, and the cost of remediation at 1.8% of GDP. EFR represented an opportunity for Morocco to induce a change in the behavior of economic agents; to generate income and raise revenues for environmental investments; to improve the urban and suburban environment; to protect natural environments; to preserve air quality and promote renewable energies; to reduce the volume of solid waste and the cost of solid waste management; and to protect water resources against all forms of pollution.

Source: GTZ 2008

Box 42: Uganda — Sustainable Fisheries User Levy

Revenues are used to initiate a long-term shift towards sustainable fishing by improving management practices and covering management costs, e.g. fisheries research and monitoring, control and surveillance. These costs are easily covered by the levy – in 2005, the equivalent of US\$ 2.46 million were collected, of which approximately one fifth of was paid into the general budget.

Prospects for future EFR in Uganda include carbon storage, ecotourism, biodiversity option values (pharmaceuticals industry), non-timber forest products, and water quality charges.

Source: Cottrell *et al.* 2008

EFR helps in making all public investments in the environment visible. There are often investments within various sectors which are not clearly explicit in the budget. An assessment can provide a means to identify what is available, where the effective environmental investments are, and what are the perverse environmental incentives. In the latter situation, EFR becomes a means of freeing additional resources which can be redirected to urgent poverty needs or of redirecting these subsidies to sustainable sector practices. But removing subsidies can be quite challenging and will depend often on the specific economic and geographic situation of a given country as well as the introduction of balanced forms of parallel approaches (OECD 2005) meant to compensate for increased environmental taxation. From an administrative and information perspective, the mechanisms needed to initiate environmental fiscal reform are also meant to increase rigor in environmental finance practices.



EFR represents a measure for strengthening legal and regulatory approaches for environmental management. The evidence suggests so far that, with careful design, EFR can increase the efficiency of the economy. However, policy makers are facing a real challenge in combining aspects of economic efficiency and political and social acceptability versus environmental effectiveness (GTZ 2008).

Pro-poor EFR is a type of EFR that is designed to contribute to poverty reduction directly by addressing environmental problems that threaten the health and livelihoods of the poor, such as water contamination, air pollution and the reduction of biodiversity and associated ecosystem services (IUCN 2007). It can also represent a means to address social inequalities by re-establishing more equity and by empowering the poor. Natural resource taxation in a context of reduced corruption can provide a source of revenue for pro-poor investment (Yaron and White 2002). It can also help generate resources to fund pro-poor initiatives, including programmes aimed at achieving development targets such as job creation.



Flickr.com/Molly Stevenson

4.3.2 Designing Innovative Environmental Finance Architecture

National reports and plans offer a wide range of options for resource mobilization at the national and international levels. Many national biodiversity strategies and action plans make reference to innovative financial mechanisms. An innovative financial mechanism can be defined as a new way of mobilizing and channeling financial resources. This could be, for example, through the incorporation of new elements, a new combination of existing elements or a significant change or departure from the traditional way of doing things. It should offer an effective, creative and unique answer to new problems or a new answer to old problems, and may be further transformed by those who adopt it. An innovative financial mechanism may take the form of new products, new policies and programmes, new approaches and new processes. New products are new marketable funding instruments that can be used to attract public and private investments in biodiversity activities and projects. Given the broad range of future environmental, economic and social gains arising from biodiversity, there are ample opportunities to develop nationally and internationally attractive new products. New policies generally refer to innovations in revenue and spending policies at the national level or in international development cooperation systems. There has been demonstrable progress in innovative revenue and spending policies at the national level, but opportunities remain to be explored in both revenue and spending policies internationally.

A recent initiative undertaken by UNEP and IUCN may generate interesting opportunities for the development of innovative financial mechanisms, in particular at the international level. Following the Millennium Ecosystem Assessment, UNEP sponsored a “High-level Brainstorming Workshop on the Creation of Pro-Poor Markets for Ecosystem Services,” and undertook an analysis of the various payments for ecosystem services (PES) pilot projects that are already being implemented around the globe and the resulting insights into the practical applicability of such payment systems. A further meeting in September 2006 identified a number of potential institutional mechanisms that would merit further investigation: (i) a prototype fund; (ii) a virtual international trading platform; (iii) a cap-and trade regime for biodiversity; or (iv) combinations of these.

In 2008 the 9th Conference of the Parties of the Convention on Biological Diversity adopted the Strategy for Resource Mobilization In Support of the Achievement Of The Convention’s Three Objectives for the Period 2008-2015 (COP 9 Decision IX/11). The part below will provide two examples of innovative financial mechanisms that can capture the importance of ecosystem goods and services.

4.3.3.1 Basket Funding Linked to EGS

The introduction of targeted and innovative budget mechanisms can aid the definition and sharing of responsibilities for environment objectives between sectors. Innovative budget mechanisms can link environmental performance to other sectors as a condition and as a means for socio-economic development. It is possible for a developing country to suggest to the donor community creative means of funding, adapted to national needs. The concept of basket funding opens the door for such possibilities where the allocation of financial resources can be closely tied to ecosystem services and the way they benefit other development sectors. For instance, environmental funding can be distributed between several sectors targeting the sector’s investments in ecosystem services, that the sector will use and manage. Some examples are:

- The agricultural sector can be geared towards promoting sustainable forms of agriculture based on diversification of its products and reducing the impacts of its activities on ecosystem services. This is important as climate change might trigger outbreaks of disease and insect infestation, whereby crops can no longer be produced in large-scale monocultures due to their lower genetic diversity (IISD 2005);

- The extractive industry can receive funding based on the introduction of best environmental technologies and practices. These would help maintain water quality and reduce its consumption while avoiding impacts on biodiversity and local populations;
- The sectors of environment and health can fund programmes increasing the focus on the ecosystem and health approach. In general, studies have demonstrated that functioning/healthy ecosystems represent an important factor in disease control.

Through an integrative approach tying the role of the environment to other sectors, resource allocation can be optimized. It can also reinforce the pro-active consideration of ecosystem services by linking financial resources to a set of combined environment and development activities. This contributes to sustainable development where economic and environment viewpoints constitute the strategic aspects of planning. This form of budget allocation focusing on the input of the environment can contribute

to the protection of ecosystem services critical to the sustainability and success of all the development sectors. This kind of basket funding could be a innovative financial instrument to mainstream biodiversity and EGS as a cross-cutting issue within the whole planning and budgeting process.

4.3.3.2 Payments for Ecosystem Services

An *innovative* way of generating revenue is achieved by looking at EGS based rewards. Governments can introduce incentive mechanisms, opening the door for green income opportunities, based on national and international funding sources. Ecosystem services of global importance are becoming increasingly attractive to national and international players from governments, NGOs or the private sector. This is visible through the development of payments and compensations for ecosystem services through carbon markets, biodiversity offsets and other market mechanisms that can reach several billion dollars. Payments for ecosystem services are mechanisms that can compensate for market failures by allowing for the financial capture of EGS benefits. PES based incentives and compensation frameworks provide the means of complementing command-and-control measures, which on their own have demonstrated limited success in terms of environmental policies. They can also complement certain traditional measures used for decision making such as cost effectiveness. Examples of benefits stemming from PES based incentives:

- Building positive approach to nature conservation;
- Having the potential to develop policies that are self-sustainable;
- Providing new sources of income to the poor;
- Providing new sources of income to environmental initiatives (outside protected areas);
- Providing benefits that can be other than monetary (reinforced land-rights, food, etc.).

There are many interpretations of PES, some of which are more restricted than others are. Among existing definitions, one that is commonly cited (Wunder 2005) identifies five points as the basis for a PES scheme:

1. A well-defined environmental service (e.g., specific changes in peak- or dry-season stream flow at the outlet of a watershed) or a suitable proxy for this service (e.g., hectares of forest conserved);
2. At least one buyer of this service or proxy;
3. At least one seller;
4. Voluntary transactions between buyer(s) and seller/provider(s);
5. Payments that are conditional on contracted environmental services (or proxies for same) actually being supplied.

Ultimately, PES represents a market-based approach to ecosystems and the services they render. There are 4 types of PES reward/compensation schemes commonly used:

- **Public payments**
- **Market-cap approach**
- **Private payments**
- **Certificate schemes (non-financial)**

Box 43: Brazil — Mercury Contamination in the Amazon

Brazilian and Canadian researchers seeking to find the source of mercury contamination in the Amazon came to a startling conclusion: agricultural practices rather than gold mining were most to blame. Supported by Canada's International Development Research Centre (IDRC), the research team is now working with communities to find short- and long-term solutions to the serious health and environmental problem. After checking soils and sediment samples, the researchers came to the conclusion that the mercury was occurring naturally in the soil and was being released into the river system — and eventually the food chain — by slash-and-burn farming. Analysis of riverbed sediments, sampled in half-centimeter increments, showed that the most recent layers contained 1.5 to 3 times more mercury than layers deposited 40 years ago.

Source: IDRC 2003



A sound PES framework can create a number of benefits (see Figure 13), including the regular financing for conservation activities, and rewards for the party or parties offering these services. Using primarily financial references, PES schemes provide an effective way of conveying to non-environmental experts concrete examples of the value of ecosystems and the role they play in our well-being. This aspect becomes essential when working with decision-makers, where trade-offs often need to be made between intensive development projects (with *high* economic returns in the short-term) and sustainable initiatives (with a vital role and substantial economic returns in the medium- and long-term).

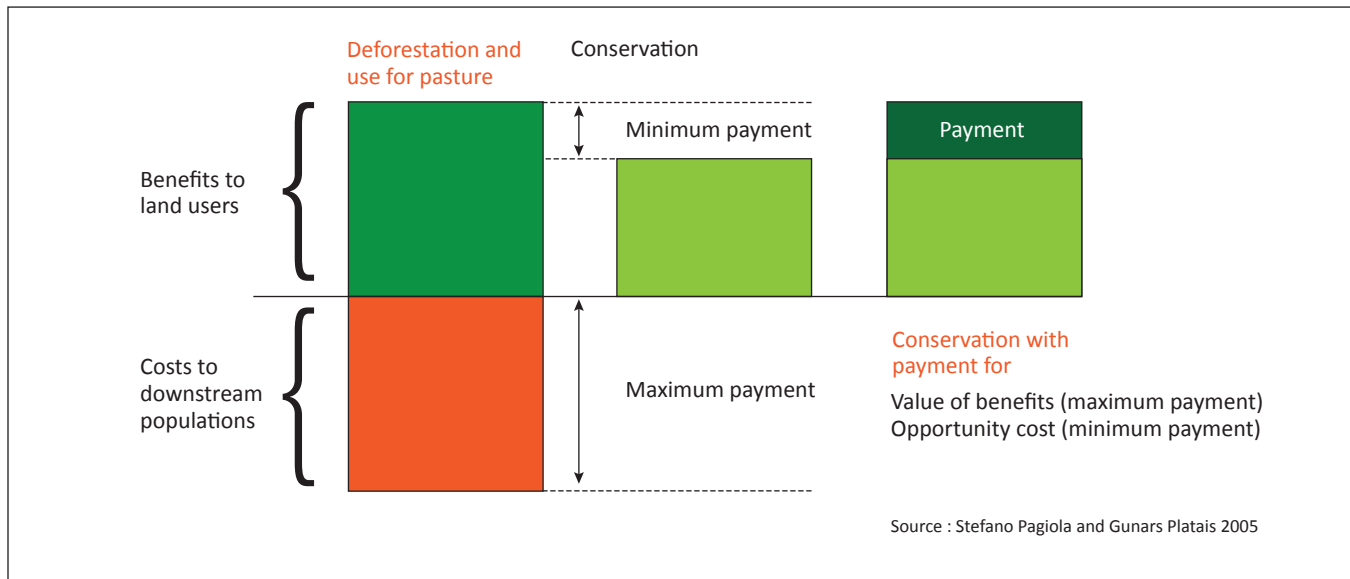


Figure 13: Benefits of Payments for Ecosystem Services Max/Min Payments

Box 44: Equitable/Pro-Poor PES vs. regular PES

Equitable/Pro-Poor PES differs from regular PES mechanisms in two ways.

First, Equitable/Pro-Poor PES schemes aim to bring substantial benefits to the poor. This can include both direct and indirect benefits, such as:

- Direct financial benefits to individual farmers, fishers or loggers, and households;
- Direct benefits that accrue at a community level, such as hospitals, schools, and roads;
- Indirect benefits such as community empowerment and land tenure;
- Indirect benefits from landscape restoration, such as decreased vulnerability to climate change;
- Indirect benefits derived from stable social, cultural, and environmental conditions.

Second, Equitable/Pro-Poor PES schemes aim to make payments to the poor in a just and equitable way. This implies that:

- Resources are applied to the priorities and needs of the poor;
- Local values, knowledge, and practices are incorporated into natural resource management practices;
- Women and marginalized groups, including indigenous communities, directly participate in, and benefit from, the PES mechanism.

Source: WWF 2006

Box 45: Cameroon — REDD goyla-Mintom

Between 2000 and 2005 Cameroon lost an average of 1% of its forest cover each year. For calculating the potential revenue generated from REDD, this figure is applied to the 830,000 ha of Ngoyla-Mintom forest cover, amounting to a forecast annual loss of 8,300 ha.

Assuming emissions of 160 tons of carbon dioxide per hectare from logging, at \$3 per ton of CO₂, REDD would generate credits worth \$64 million (net present value over 30 years using a 5% discount rate), well in excess of the \$26 million in concession fees (NPV over 30 years at a 5% discount rate). The \$38 million difference seems likely to more than make up the opportunity costs of forgoing the jobs and local development from timber harvesting.

These calculations err on the side of caution. Carbon emissions from the logging or deforestation of Ngoyla-Mintom would likely be considerably higher than the figures used, especially if the land was later converted for agriculture. Further, REDD credits are presently higher than \$3 and European ETS credits currently trade for more than \$90 per ton. Even so, the current model suggests that at a price point of \$1.21, REDD credits would break-even with revenue from logging concessions. Carbon traders, not conservationists, could become the saviors of Ngoyla-Mintom forest.

Source: Rhett A. Butler 2008

PES schemes were originally developed without the express intent of taking a pro-poor approach (see box 44). Inclusion of social objectives to the original conservation goals has been attracting the attention of various players in the development field. The nexus between healthy ecosystems and poverty alleviation was highlighted in The Economics of Ecosystems and Biodiversity (TEEB) report as one of its main observations (EU 2010). In the context of developing countries, PES can provide extra sources of income and/or non-financial rewards for rural communities and indigenous peoples involved in sustainable nature stewardship. The capacity of ecosystem services to help alleviate poverty becomes even more obvious in the context of achieving global objectives such as the Millennium Development Goals (MDGs).

Various national and international bodies active in the environment and development field have joined together to identify how biodiversity and environmental systems can effectively alleviate poverty. New poverty-environment initiatives have been put in place by donor agencies, foundations and even the private sector to help reverse the trends of environmental degradation and fight poverty. With the threat of climate change, there is a global mobilization to help protect existing forests by providing monetary incentives (See box 45) to developing countries, through initiatives like the Reduced Emissions from Deforestation and Forest Degradation (REDD and REDD-Plus) and other emission reduction and trading mechanisms. REDD has the potential to provide benefits to local and indigenous communities. However, a number of conditions would need to be met for these co-benefits to be achieved. For instance, Indigenous Peoples are unlikely to benefit from REDD where they have no secure land tenure.

4.3.3 Medium Term Expenditure Framework

Within the context of introducing sound budget practices, governments can benefit from the use of Medium Term Expenditure Frameworks (MTEF). MTEF can help establish a planning and budget formulation process within which the Cabinet and central agencies establish credible contracts for allocating public resources to their strategic priorities while ensuring an overall fiscal discipline. The MTEF process entails two main objectives: the first aims at setting fiscal targets, the second aims at allocating resources to strategic priorities within these targets. An MTEF offers policy and financial experts an additional lens to foresee budget changes and adjust regularly available resources according to projected expenses and revenues. It is a rigorous method that allows financial officers to identify the capacity of the country to dedicate the necessary resources to each of the sector strategies. Some MTEF benefits include:

- Greater budget predictability allowing institutions to plan with more certainty for multi-year programmes;
- Improved strategic planning and management through better priority-setting and preparing multi-year, costed programmes to achieve them;
- A better system of target-setting and performance indicators to put in place credible monitoring procedures;
- Improved and more accurate financial planning: the medium-term perspective in budgeting is particularly beneficial to environmental actions, which are often long-term in nature;
- Greater demand for good economic and financial tools to prepare well-costed programmes as environmental agencies need to demonstrate a convincing use of available resources (UNEP-PEI 2009).

This form of multi-year budget management discipline is particularly important when dealing with environmental issues and implementing a country's PRSP. In general, environmental investments (e.g. in environmental infrastructures, ecosystem restoration, biodiversity and conservation initiatives) require several years before achieving all of the expected financial and non-financial benefits. An Environment Ministry's participation in the development of a budget falling under a Medium Term Expenditure Framework can assist its strategic planning by allowing budget allocations to be harmonized with medium- to long-term environmental time frame requirements. Environment Ministries can benefit from this coherent form of budgeting linked to multi-year projections and targets by minimizing the gap between stated sector policies and available financial resources. With the help of MTEF, environmental programmes can identify and access stable sources of funding without being severely impacted by budget cuts.

From an equity and transparency perspective MTEF can strengthen the budget democratization and accountability process. It can be built using the input of various stakeholders, including for instance the views provided by village or municipal authorities in the case of decentralized governments. Elaboration of the budget based as much as possible on a multi-stakeholder process offers a space for dynamic discussions, and opportunities for environmental players to be heard. Inclusive budgeting processes inviting all stakeholders from environmental agencies, the private sector and civil society to identify their respective priorities, constitute a good practice in many ways. It is an opportunity to build ownership and support for environmental plans and to

Box 46: South Africa and Armenia — MTEF

[...] the long-term nature of some environmental (particularly infrastructure investment) policies clearly benefit from the stability created by the medium-term expenditure framework and the government commitments to stick to the financial ceilings allocated to the sector. In South Africa and Armenia, actual allocations have been higher than requested in recent years. This also points to the fact that some re-allocation of resources to the environment sector within the MTEF framework has been taking place.

Source: OECD 2009



mainstream EGS benefits within national policies. Processes that favor dialogue built on environment as a cross-cutting theme are more likely to lead to appropriate fund allocations to environmental programmes. It suggests to donors a positive signal of a country's efforts to increase accountability and budget discipline of its ministries. Studies of various developing countries conducted by the OECD show that where environmental programmes are well-designed and justified in economic terms, such programmes stand a higher chance of being funded through the regular budget processes (OECD 2009).

For an Environment Ministry, a MTEF can represent an effective measure of moving away from a project focused budgeting philosophy to development of programme based planning. In terms of factoring biodiversity and ecosystem dimensions, MTEF facilitates the stronger integration of medium- to long-term ecosystem services targets into other sectors. This is achieved as MTEF becomes a strategic forum of dialogue and can assist in improving resource allocation between and across sectors, providing an entry for environmental mainstreaming.

A MTEF can be seen as an instrument to alter the *status quo* and to have sectors being able to effectively and efficiently administer their budgets. It is also another opportunity of strategically factoring ecosystem contributions within sectoral budget plans (see Table 10).

Table 10: MTEF STAGES

STAGE	CHARACTERISTICS
I. Development of Macroeconomic Framework	<ul style="list-style-type: none">▪ Macroeconomic model that projects revenues and expenditure in medium-term.
II. Development of Sectoral Programs	<ul style="list-style-type: none">▪ Agreement on sector objectives, outputs, and activities;▪ Review and development of programs and sub-programs;▪ Program cost estimation.
III. Development of Strategic Expenditure Framework	<ul style="list-style-type: none">▪ Analysis of inter- and intra-sectoral trade-offs;▪ Consensus-building on strategic resource allocation.
IV. Definition of Sector Resource Allocations	<ul style="list-style-type: none">▪ Setting medium-term sector budget ceilings.
V. Preparation of Sectoral Budgets	<ul style="list-style-type: none">▪ Medium-term sectoral programs based on budget ceilings.
VI. Political Approval	<ul style="list-style-type: none">▪ Presentation of budget estimates to cabinet and parliament for approval.



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Notwithstanding all of the above benefits, introducing an MTEF in a country where the institutional structures and capacities are still fragile can be quite challenging. A MTEF is a complement not a substitute to budget reforms. In terms of tying budgets to ecosystem services and integrating green priorities within sectors' plans, other complementary mechanisms will also be required. Some of these budget-related initiatives have been discussed in the sections above and other budget monitoring and management practices will also be introduced within Section 5 of this Good Practice Guide dealing with implementation measures.

Green Budgeting Benefits

- Contributing to poverty reduction, EFR for pro-poor investments;
- Leveling the social balance by re-establishing a certain equity, and by empowering the poor;
- Providing a source of revenue for introducing a discipline in environmental finance practices;
- Strengthening legal and regulatory approaches for environmental management;
- Increasing the efficiency of the economy;
- Increasing efforts to consider environmental effectiveness in planning;
- Generating recurrent environmental revenue;
- Enhancing capacity to identify potential impacts of subsidies on ecosystem goods and services;
- Allowing institutions to plan with more certainty for multi-year programmes through greater budget predictability;
- Improving strategic planning and management through better priority-setting and preparing multi-year, costed programmes to achieve them;
- Introducing a better system of target-setting and performance indicators to put in place credible monitoring procedures;
- Improving financial planning accuracy based on a medium-term perspective in budgeting - particularly beneficial to environmental actions, which are often long-term in nature;
- Responding to greater demand for good economic and financial tools to prepare well-costed programmes as environmental agencies need to demonstrate a sound use of resources;
- Introducing innovative incentive mechanisms through payments for ecosystem services;
- Enhancing distribution of budget allocations based on EGS inputs and benefits to each sector;
- Identifying new funding opportunities based on ecosystem goods and services and their contribution to sector development;
- Enhancing dialogue/cooperation between environmental ministries and other sectors according to role of EGS;
- Bringing environmental issues up-front and facilitating their links to aid delivery;
- Reducing pressure on the environment sector as a result of increased funding through the national budget.

4.4 Greener National Development and Poverty Reduction Strategies

A national development strategy or a Poverty Reduction Strategy Paper (PRSP) are common overarching means for articulating a country's long-term vision into operative mid-term policies, plans and programmes. They can offer a space and mechanisms for environmental issues to be further explored and debated. However, the effective mainstreaming of environmental dimensions within these strategies is still limited. A World Bank (2004) review of close to 50 Poverty Reduction Strategy Papers (PRSPs) noted that the environmental focus within PRSPs has been generally weak. An increasing number of initiatives (e.g. payments for watershed services, carbon sequestration, etc.) and studies such as *The Economics of Ecosystems and Biodiversity* (2008) stress the importance of EGS to development. There is an increasing understanding that the Millennium Development Goals will not be met unless the sustainable use of ecosystem services is made an integral part of the development strategies of developing countries. Investment in enhancing and protecting ecosystems, and preventing and adapting to climate change, is essential to the achievement of sustainable development. From a policy perspective, ecosystems, and sustainable development in general, must be dealt with in an integrated manner within the context of the MDGs.

The Good Practice Guide has introduced a number of steps to turn towards a pro-active form of planning built around EGS. This is done by integrating the importance of ecosystem goods and services within a country's legal frameworks and long-term vision. By including EGS objectives within National Sustainable Development Strategies, implementing Multilateral Environmental Agreements and reinforcing environmental governance, countries can set a sound background for greener policies and their effective implementation through medium-term strategies. The Good Practice Guide has thus explored various approaches and tools as means to mainstream EGS within both the policy and financial planning processes. At the essence of these mainstreaming initiatives there is a need to assess the state and value of ecosystem goods and services building a better understanding of their role and benefits to development and poverty alleviation. The main purpose being to *green* planning approaches (sector, spatial and decentralized plans) by integrating EGS friendly and pro-active concepts in development processes. From a sector perspective this means looking at the interdependence of all sectors in terms of their use and impact on shared EGS. The objective is to balance the equitable and sustainable use of EGS between beneficiaries without causing their depletion or reducing ecosystem resilience, while also identifying ways to maximize benefits. Greener plans can



be elaborated by allowing an Environment Ministry (and environmental stakeholders) to engage actively in the preparation of sector plans and by strategically aligning EGS objectives between sectors. The second entry point was to focus on spatial planning as a way of looking at the use of ecosystem resources, taking into consideration the cumulative impacts of sectors on direct and neighboring ecosystems across time and space. A set of EGS inclusive approaches such as the ecosystem approach and the strategic environmental assessment were presented. In terms of decentralized plans, implementing policies at the lowest-level provides a way of capturing local experiences in resources use and management. Decentralization provides a step to make sure that EGS control and access involve all stakeholders including local communities. It is also a means for building a sense of ownership and consequently to engage all users in responsible ecosystem management. Ecosystem based policies become a mechanism for both horizontal and vertical integration of development plans. This can lead to equitable and integrated development strategies, capable of capturing the linkages between economic and environmental dimensions (see Figure 14). From the environmental perspective and following scientific findings and inter-disciplinary assessments and scenarios, these “greener” plans would respond to the triple challenge of sustainable development and poverty reduction:

1. To balance environmental needs with development needs through the following steps:
 - Reducing the human ecological footprint;
 - Increasing the use-efficiency of scarce natural resources or ecosystem services;
 - Maintaining the consumption of ecosystem services and other natural resources within ecological limits.
2. To balance the impacts and investments of the various development sectors on biodiversity and ecosystem services through the following steps:
 - Securing an optimal allocation of the available ecosystem services, and their collective management, among the development sectors in order to generate the best possible overall socio-economic outcomes from resource use;
 - Achieving a well tuned inter-sectoral distribution of costs and burdens for investments in ecosystem resilience and productivity by reducing the ecological foot-print.
3. To achieve a fair and equitable sharing of environmental benefits within society through the following steps:
 - Assuring sufficient access to basic ecosystem services for all as a fundamental human right for a dignified livelihood;
 - Assuring a fair distribution of costs and benefits arising out of the maintenance and use of ecosystem services among the different segments of the society;
 - Protecting society, and specifically the most vulnerable, against natural disaster and its consequences through risk reduction strategies and post disaster mitigation.

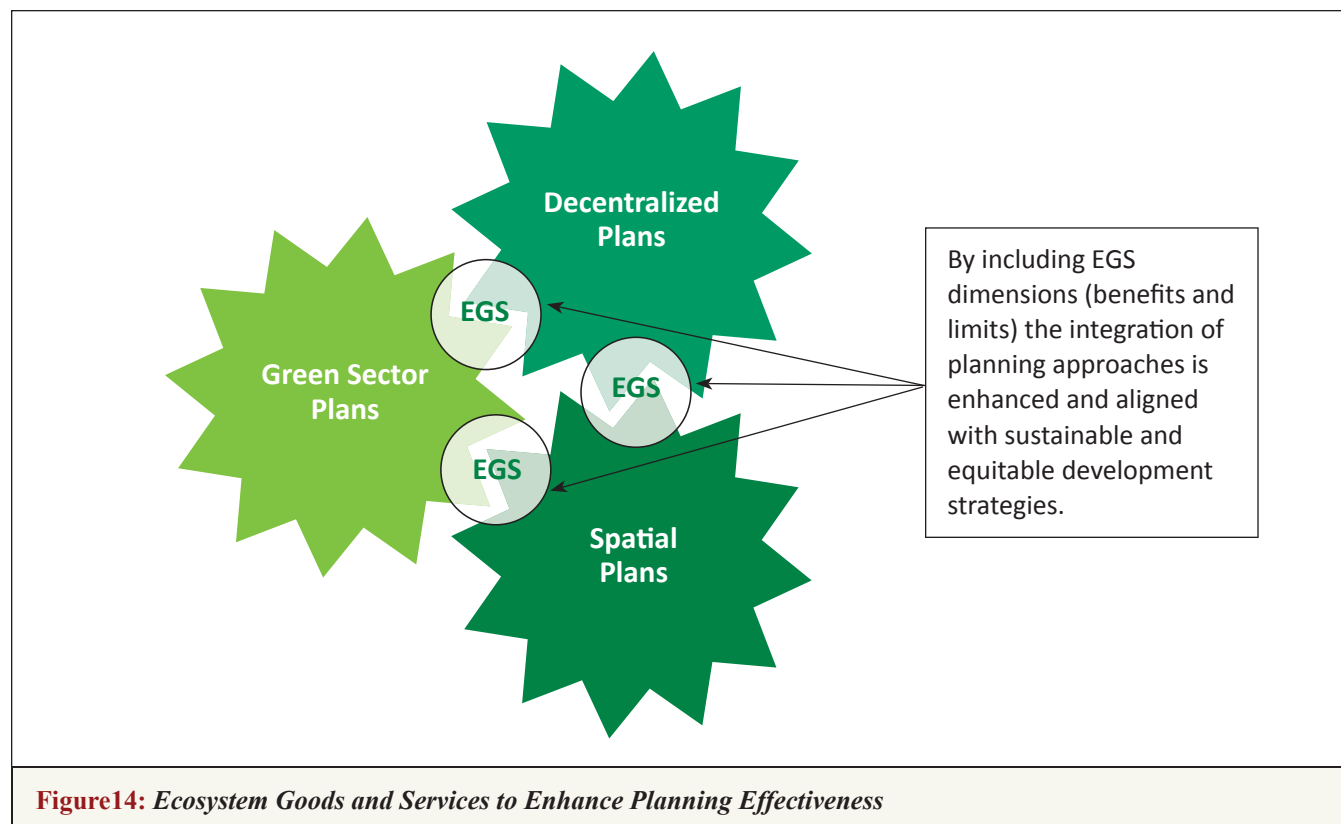


Figure14: *Ecosystem Goods and Services to Enhance Planning Effectiveness*

For greener policies and plans to be successful, the availability of resources and effective distribution of EGS based budgets is critical. The financial section has presented a series of steps to reinforce strategic and rigorous budgeting procedures. Through the Medium Term Expenditure Framework opportunities become possible to identify means for the environment ministry to consider strategic budgeting rather than project based budgeting, and to link its budget to other sector objectives. Environmental Fiscal Reforms are a means to generate environmental income while reducing perverse subsidies. The financial section also covered innovative financial mechanisms where EGS contributes to balanced budget distribution, taking into consideration environmental dimensions. This is achieved by taking into consideration the role and contribution of EGS to individual sectors and allocating funds in consideration of ecosystem inputs to development. Innovative approaches were also introduced for generating income by taking advantage of national and international initiatives aimed at encouraging sound ecosystem stewardship. The concept of payments for ecosystem services was presented as a market-based source of greener income generation while preserving ecosystem resilience and suggesting alternative or sustainable uses.

All of the above discussed measures represent essential entry points towards greening planning and financial processes. These mainstreaming measures are all complementary and can be initiated simultaneously and adjusted when necessary. However, to reach successful results on the ground, these measures require adequate means of implementation. For instance, the development of EGS based capacity- and awareness-building, as well as the implementation of monitoring and knowledge sharing initiatives, are additional conditions for success. It is also necessary to select implementation mechanisms that permit flexibility for both horizontal and vertical policy adjustments when necessary. This can be framed within an adaptive form of management to capture successful results. An overview of these dimensions will follow in the next section.



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SECTION 4 SUMMARY

Concept/Issues Overview	Definition/Details	Some Facts/ Recommendations
Ecosystem Goods and Services Assessment and Valuation	<p>The ability to attribute a value to ecosystem services provides a starting point to integrate EGS within existing policy and budget processes.</p> <p>EGS assessment and valuation are crucial instruments to factor and integrate biodiversity and ecosystems within policy and planning processes by allowing the following:</p> <ul style="list-style-type: none"> ▪ Providing justification; ▪ Building argumentation; ▪ Raising awareness; ▪ Enhancing planning processes. 	<ul style="list-style-type: none"> ▶ Global ecosystem services provide up to \$70 trillion per year of economic benefits. ▶ Wetlands, of which half have been destroyed globally, still have an economic value of \$7 trillion per year. <p><i>Ecosystem Services Approach :</i></p> <p>Step 1: Identify the ecosystem services in play; Step 2: Screen the ecosystem services for relevance; Step 3: Assess the condition and trends of the relevant ecosystem services; Step 4: Assess the need for an economic valuation of services; Step 5: Identify ecosystem service risks and opportunities.</p>
Approaches for Integrative Planning Processes	<p>The cross-cutting, trans-boundary and trans-generational characteristics of environmental management contributes a level of complexity different from conventional sector policies. For instance, as markets fail to capture the role of ecosystems and their complexity, perspectives on the environment continue to be fragmented and dominated by the activities and priorities of more prominent sectors (agriculture, forestry, health, etc.).</p>	<p>It is important to target various levels of planning to identify mechanisms where ecosystem based initiatives could be introduced. In general, countries rely on three planning approaches to turn development policies into concrete actions:</p> <ul style="list-style-type: none"> ▪ Sector plans; ▪ Decentralized plans; ▪ Spatial plans. <p>In integrating the concept of EGS the three planning approaches can benefit from better integration and interactivity.</p> <p>Guidance strategies to be used for <i>green</i> planning processes are National Biodiversity Strategies and Action Plans (NBSAP) as well as other planning mechanisms of other MEAs.</p> <p>Implement the concept of ecosystem services as an angle of approach within Strategic Environmental Assessments (SEAs) and Environmental Impact Assessments (EIA).</p>
Sector Plans	<p>Ecosystem services are often required to meet multiple and sometimes diverging sector goals.</p> <p>There is a triple challenge for sustainable planning of sector policies:</p> <ol style="list-style-type: none"> 1. better ecological balance between the development sectors and the environment; 2. better inter-sectoral distribution of ecosystem services to generate the best overall outcome for sustainable development and poverty reduction within ecological limits; 3. better distribution of benefits and sufficient access to vital ecosystem services for all the segments of the society. 	<p>Opportunities for strategic dialogue are found through multi-stakeholder platforms. When possible, an Environment Ministry should regularly engage other sectors to help them pro-actively integrate environmental dimensions. This approach will have the following benefits:</p> <ol style="list-style-type: none"> 1. Understanding the thresholds of ecosystems and their resilience levels; 2. Capturing and optimizing benefits from ecosystem goods and services; 3. Harmonizing and integrating the different sector strategies in terms of their use of common ecosystem goods and services; 4. Identifying mitigation measures to reduce the ecological footprint and adaptation measures to climate change.

SECTION 4 SUMMARY

Concept/Issues Overview	Definition/Details	Some Facts/ Recommendations
Spatial Plans	<p>The process of greening sector plans relies on the use of spatial approaches. The issue of scale is paramount in ecosystem management. Inevitably, there will be a geographical mismatch between social institutions and natural processes. The challenge is in finding an approach that can best complement both scales.</p> <p>Spatial planning should provide an opportunity for multi-stakeholder collaboration to express its views and interests on resource use and to negotiate proper institutional arrangements for implementation.</p>	<p>Spatial planning, in its holistic manner, can be inspired by the ecosystem approach. The latter is the primary framework for action under the Convention on Biological Diversity and has been introduced and promoted by a number of international organizations as an effective way of managing ecosystems. It links human to ecosystem dimensions across space and time taking into consideration ecosystem management needs and contributions of stakeholders.</p> <p>The ecosystem approach can integrate sector needs and spatial planning and is also important when looking at risks of natural disasters and climate change adaptation.</p> <p>For coherent planning and management of ecosystems and ecosystem services multiple institutional arrangements are needed across administrative borders and levels. For instance between communities and municipalities (sub-national level), between countries (trans-boundary level) and in the context of regional organisations (supra-national).</p>
Decentralized Plans	<p>The benefits of ecosystems are best identified and assessed in terms of their role and importance to direct users.</p> <p>In order to manage ecosystems and ecosystem services effectively there is a need for a clear definition of the role of local, regional and central authorities to enhance vertical coherence among administrative levels and horizontal integration between sector policies.</p>	<p>One approach that is increasingly gaining recognition for its involvement of local people is Indigenous and Community Conserved Areas (ICCAs)</p> <p>Promoting community-based natural resource management can help maintain the viability and services of ecosystems.</p> <p>However, the skills and methods to undertake decentralized participatory planning can be lacking or weak, and finances to implement plans inadequate.</p> <p>Decentralized planning and implementation need a proper political, legal and institutional environment, as well as strong capacity building efforts, to be successful.</p>
Measures for Greener Budgeting Processes	<p>While policies can be generally cognizant of the role played by the environment, this attention is not necessarily well-articulated in budget processes.</p>	<p>Key sectors need to effectively integrate environmental dimensions by dedicating adequate budgets and sets of activities that capture their common dependence on EGS. Conversely, an Environment Ministry needs to be able to compete for funding equitably in reference to other sector ministries by actively engaging in budget preparations and offering revenue and development alternatives.</p>
Environmental Fiscal Reform	<p>Environmental Fiscal Reform (EFR) refers to a range of taxation and pricing measures which can raise fiscal revenues while furthering environmental goals.</p> <p>EFR offers an opportunity to generate recurrent environmental revenue and halt the erosion of natural resources. Pro-poor EFR is a way of contributing to poverty reduction directly by addressing environmental problems that threaten the health and livelihoods of the poor.</p>	<p>EFR examples:</p> <ul style="list-style-type: none"> ▶ Measures removing perverse incentives; ▶ Natural resource pricing measures, such as taxes for forests and fisheries exploitation, are relevant for most resource-rich countries – which tend to be low-income countries; ▶ Reforms of product subsidies and taxes are applicable to most countries, but particularly energy producing countries where fuel subsidies are often high; ▶ Cost recovery measures, such as user charges on energy and water, are applicable to most countries but must be implemented carefully to protect the poor; ▶ Pollution charges are particularly relevant for rapidly industrializing middle-income countries where industrial pollution is a serious problem but administrative capacity is relatively strong.



SECTION 4 SUMMARY

Concept/Issues Overview	Definition/Details	Some Facts/ Recommendations
Designing Innovative Environmental Finance Architecture	<p>Exploring available options to generate new sources of environmentally based revenues and to reinforce sustainability.</p> <p>The concept of basket funding creates the possibility of allocating financial resources that are closely tied to ecosystem services and their benefits to all development sectors. Payments for ecosystem services (PES) schemes are based on a market-based approach to ecosystems.</p>	<p>Reducing Emissions from Deforestation and Forest Degradation (REDD) is a PES initiative designed to create financial value for the carbon stored in forests. It is predicted that financial flows for greenhouse gas emission reductions from REDD+ could reach up to US\$30 billion a year.</p> <p>Examples of benefits related to PES:</p> <ul style="list-style-type: none"> ▪ Building a positive approach to nature conservation; ▪ Having the potential to develop policies that are self-sustaining; ▪ Providing new sources of income to the poor; ▪ Providing new sources of income to environmental initiatives (outside of protected areas); ▪ Providing non-monetary benefits (reinforced land-rights, food, etc.).
Medium Term Expenditure Framework	<p>The MTEF process entails two main objectives: the first aims at setting fiscal targets and the second aims at allocating resources to strategic priorities within these targets. In this way, environmental policies benefit from stable government commitments to stick to the financial ceilings allocated to their green sector.</p>	<p>By introducing an MTEF, the Ministry of Finance opens a strategic dialogue that can assist in improving resource allocation between and across sectors, and provide an entry point for environmental mainstreaming. An MTEF can be an effective means for an Environment Ministry to move away from project focused budgeting and favour the development of programme based planning. In terms of biodiversity and ecosystem dimensions, MTEF facilitates the stronger integration of medium- to long-term ecosystem services targets into other sector's.</p> <p>However, introducing an MTEF in a country where the institutional structures and capacities are still fragile can be quite challenging. An MTEF is a complement not a substitute to budget reforms.</p>
Greener National Development and Poverty Reduction Strategies	<p>Ecosystem based policies can be a mechanism for both horizontal integration between sector policies and vertical integration between administrative levels.</p> <p>Mainstreaming EGS within all levels of development planning provides for improved harmonization and integration of sector, spatial and decentralization plans. The latter are also to be linked to budget mechanisms for effective environmental considerations and innovative revenue opportunities. Together, the above mix of measures can lead to improved outcomes for poverty alleviation and development within ecological limits.</p>	<p>From the environmental perspective and following scientific findings and inter-disciplinary assessments and scenarios, these "greener" plans would respond to the triple challenge sustainable development and poverty reduction:</p> <ol style="list-style-type: none"> 1. To balance environmental needs with development needs; 2. To balance the impacts and investments of various development sectors in biodiversity and ecosystem services; 3. To achieve fair and equitable sharing of environmental benefits within society.

5 Measures to Enable Implementation of Ecosystem Goods and Services within Development Plans

5.1 Developing Capacity and Raising Awareness

Policy choices can be hampered by a lack of capacity to effectively implement environmental goals. Building capacity and raising awareness about biodiversity, ecosystem management and services are critical to an Environment Ministry and all development sectors. These initiatives can reinforce Ecosystem Goods and Services (EGS) knowledge and skills around environment/development and environment/poverty reduction mechanisms so that these dimensions can become visible and factored into planning and budgeting process.

5.1.1 Raising Awareness

The process of integrating ecosystem goods and services within development policies relies on dissemination of knowledge concerning the role played by ecosystems for human development. Presently, there is a growing body of research on the benefits of ecosystems and biodiversity for human well-being. This knowledge can be helpful when brought to the attention of decision makers. In order to make informed decisions and integrate such topics into policy and legislation at all levels, awareness of EGS issues is necessary, and should target government and stakeholders within and outside the environment community.

Messages can target all sectors focusing primarily on damaging development activities (e.g. mining, forestry, etc.). Awareness forms part of building environmental governance and a means for empowering vulnerable groups and the poor. It encourages their involvement in planning and greater understanding of their ecological rights. EGS awareness strategies can be effective by disseminating messages focusing on EGS benefits and rewarding responsible management practices. Awareness should motivate stakeholders to maintain or to turn towards greener initiatives without fear of losing economic advantages or access rights. But it is desirable for governments to build awareness that highlights realistic targets. A key message to be communicated is that ecosystems are indispensable to human well-being and economic development (in tangible and non-tangible forms). However, as EGS is an emerging field, there are still certain gaps in terms of arguments and knowledge, thus slowing the effective integration of the concept within policies.

5.1.2 Developing Capacity

Awareness and capacity building are two complementary activities. The successful development and implementation of policies and budgets highlighting the role of EGS can depend on technical and non-technical issues (e.g. sector objectives, available financial resources, human skills, political will). In the context of EGS, capacity development can vary from one country to another according to the types of needs and the state of ecosystems and biodiversity, and should be adapted to specific institutional circumstances.

Mainstreaming the concept of ecosystem goods and services in policies will depend on the capacity of scientists to communicate their knowledge concerning ecosystem services and biodiversity effectively and practically. This perspective is needed to complement traditional economic based metrics in decision making. Translating scientific knowledge into socio-economic benefits, to be used by decision makers and included within plans and programmes, is an example of an identified capacity development gap (see box 47). This need has been highlighted in the work conducted by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES 2009a).

Capacity development measures can involve staff in ministries of finance as they often have insufficient understanding of the nature of environmental investments and their economic benefits. The end result becomes a chronic under-funding of environmental programmes and investments. This signals the need for targeted training and capacity-building of staff of ministries of finance on issues related to environmental finance. In order to build capacity of the ministry of finance staff, these staff should be involved in the preparation of guidelines for designing environmental programmes from the outset (OECD 2009).

Capacity building for government institutions can also focus on the introduction of incentives that promote the sustainable use of ecosystem services. These rewards can come in the form of both financial and non-financial

Box 47: Capacity Building Between Science and Policy

[...] numerous institutions and processes are helping to build capacity to use science effectively in decision-making at all levels. Significant gaps, however, remain in terms of the capacity to produce relevant knowledge effectively, to formulate or reflect critically on policy choices, to translate knowledge into policy action and to coordinate these processes. [...] There is also a need to build the capacity of scientists in developing countries to engage more effectively in science-policy dialogues on biodiversity and ecosystem services for human well-being. This includes the need to build scientists' capacity to provide scientific information in a manner that can be used not only by environmental decision makers but also by economic and development decision makers.

Source: IPBES 2009b

**Box 48: Kenya – Workshop: Building Ecosystem Services Research Capacity for Semi-Arid Africa**

The Pro-Poor Rewards for Environmental Services in Africa (PRESA) project conducted a capacity building workshop in 2009 on Ecosystem Services Research for semi-Arid Africa. It aimed at strengthening the capacity of African implementing agencies and researchers working on rewards for environmental services initiatives. The training included visits to the Sasumua region of Central Kenya and environmental projects initiated by community groups in the Mount Kenya East eco-region. Organized by Pro-poor Rewards for Environmental Services in Africa, the workshop sought to share background information on ecosystem service tradeoff assessments and the impacts of various financial and regulatory instruments. Trainers from ICRAF and the Macaulay Land Use Research Institute facilitated the workshop for the 64 participants, who came from Kenya, Uganda, Tanzania, Malawi, South Africa, Indonesia, Guinea, USA and Europe. Sessions included information on the ecosystem services approach, bridging the gaps between knowledge and action, valuation of ecosystem services and contract design. The workshop helped understand the 'Payments for Environmental Services landscape', including the diverse actors, institutions, tools and policy issues.

Source: PRESA 2009

Box 49: Capacity building on mainstreaming biodiversity and ecosystem services for sustainable development and poverty reduction

The overall purpose is to integrate biodiversity and ecosystem services considerations into broader development and poverty reduction processes at regional, national and subnational levels., through capacity-building on environmental mainstreaming in developing countries. That will enable conditions for biodiversity conservation and the sustainable management of ecosystem services as a fundamental contribution to poverty reduction and development in developing countries.

Target groups:

- Policy-makers from various government sectors and departments;
- Practitioners from relevant public, private and business sector, local communities and indigenous organizations;
- Scientists and researchers from different disciplines.

Expected outcomes of capacity building:

- a) A more holistic and systemic recognition on the fundamental interrelations and interdependences between biodiversity, ecosystem services and human well-being, and on the full range of benefits and ecological limits that the environment offers for development and poverty reduction;
- b) A more effective environmental governance approach including the support to governance structures that help to enable and empower all groups and with special emphasis of indigenous and local communities to participate fully in decisions on resource and ecosystem-services usage and expanding effective governance practices – equivalently as described within and in accordance with the programme of work on protected areas - from protected areas to the whole land and seascape;
- c) A more integrative and adaptive environmental planning approach incorporating strategic measures for environmental sustainability into sectoral, spatial, and broader multi and cross-sectoral development and poverty reduction policies, programmes and strategies at the regional, national, and decentralized subnational level, in accordance with the mainstreaming guides and provisions of the Convention on Biological Diversity for national biodiversity strategies and action plans;
- d) A more effective environmental finance management system based on national and external finance sources and investments in biodiversity and ecosystem services through public, market-based, and community-based mechanisms in accordance with the Strategy for Resource Mobilization and the programme of work on incentive measures of the Convention on Biological Diversity;
- e) A more effective transfer, adaptation and generation of environmental technologies and innovations aiming at solutions for sustainable management of biodiversity in practice in accordance with the programme of work on technology transfer, technological and scientific cooperation and its implementation strategy.

Source: Annex II of CBD-WGRI 3 Recommendation 3/3: Integration of biodiversity into poverty eradication and development / DRAFT provisional framework on capacity-BUILDING FOR mainstreaming biodiversity and ecosystem services for sustainable development and poverty reduction (UNEP/CBD/COP/10/4)

means (e.g. green certification, payments for ecosystem services, fiscal incentives, etc.), targeting the private sector and communities with responsible environmental stewardship activities. As such, further capacity building measures will be needed in the assessment and valuation of ecosystem services. Capacity building can also involve reinforcing the ability of institutions in adoption of the Ecosystem Approach and complementary strategies and tactics such as EGS inclusive Strategic Environmental Assessment, Environmental Impact Assessment, and mainstreaming EGS within development planning. The Paris Declaration

identifies this gap and calls upon donors and partners to “develop and deepen common procedures for projects and develop and apply common approaches for Strategic Environmental Assessment at the sector and national level. It also implies that donors join forces to provide co-ordinated capacity development support at the national, sub-national and regional levels.

Above examples provide a general idea of some of the initiatives needed in terms of EGS based capacity building. Capacity building initiatives can also focus on harmonization of EGS objectives within national plans/strategies related to climate change, biodiversity, desertification, wetlands (and other Multi-lateral Environmental Agreements). Improved harmonization can contribute to better mainstreaming of MEA plans within development policies. Capacity building initiatives can also involve the development of tools, datasets and networks, to improve experts’ capacity to assess ecosystem services and identify their role in a country’s development, human well-being and poverty reduction.

5.2 Monitoring Ecosystem Goods and Services in Policy and Budget

Monitoring and evaluating the environmental performance/impacts of development plans, can guide policy and budgeting choices. It can also help in documenting, valorizing successful initiatives and pooling financial resources and best practices. It provides a mechanism for acquiring environmental data and building EGS knowledge and is a means for re-adjusting policies. The lack of resources and capacities has often led developing countries to be selective about their monitoring schemes and to be limited in terms of sustained monitoring capacities. Regular monitoring can contribute to understanding EGS related benefits such as:

- Adjusting policies, plans and programmes based on improved understanding of ecosystem goods and services;
- Identifying optimum budget allocations to successful EGS initiatives demonstrating benefits to socio-economic sectors;
- Allowing donor agencies to assess the environmental progress of development plans and when necessary to allocate further funds more efficiently.

5.2.1 Policy Indicators

Some developing countries have successfully integrated the role played by environmental systems and biodiversity within development policies by linking them to green indicators. Indicators could reflect the role and condition of ecosystem goods and services. In this respect many have adjusted their strategies and second generation PRSPs to include clear environmental objectives (e.g. Mozambique, Madagascar, Ghana). For instance, General Budget Support is linked to performance indicators whereby donors can turn towards socio-economic and environmental indicators to assess the overall success and progress of a country’s development/poverty reduction strategy. The importance of green dimensions in aid cooperation has been increasingly visible on the agendas of donor agencies and countries are encouraged to dedicate active efforts to the environment. Performance Assessment Frameworks (PAF) are used to evaluate the progress of development/poverty reduction strategies (see box 50). Indicators can help communicate to policy-makers the condition, trends and rate of change in ecosystem services and their contribution to development. They are also important in the context of natural disaster management to monitor climate change and ecosystem resilience.

Box 50: Tanzania — Environment Dimensions in Performance Assessment Framework

In Tanzania, where donors provide direct budget support of approximately \$USD 600 million per year, it was imperative to ensure that aid had an environmental sustainability component. The Government of Tanzania, with the support of some donors, developed environmental indicators for the Performance Assessment Framework [...] The inclusion of these indicators has helped elevate the environment to a higher level and has also focused government attention on its own environmental performance.

14% of the targets of the second PRSP of Tanzania are related to environment and natural resources.

Source: UNEP-PEI 2008

Box 51: Samples of Indicators from the initiative — Building the Partnership to Deliver the Global 2010 Indicators:

Sustainable use

- Area of forest under sustainable management: certification;
- Area of forest under sustainable management: degradation and deforestation;
- Area of agricultural ecosystems under sustainable management;
- Proportion of fish stocks in safe biological limits;
- Status of species in trade;
- Biodiversity for food and medicine.

Ecosystem integrity and ecosystem goods and services

- Marine Trophic Index;
- Water quality;
- Forest Fragmentation;
- River fragmentation and flow regulation;
- Health and well-being of communities;
- Nutritional status of biodiversity;
- Biodiversity for food and medicine.

Source: BIP 2008



Flickr.com/Rocco Lucia



There is a variety of environmental indicators commonly used to monitor issues such as water quality, air pollution, the percentage of protected areas, the state of endangered species, etc. To effectively take EGS into consideration, indicators should bridge socio-economic dimensions and ecosystem services. Indicators can be subsequently linked to various development sector objectives and needs. The Millennium Ecosystems Assessment identified the lack of ecosystem based indicators as one of the main challenges to be addressed in helping governments integrate ecosystem goods and services dimensions in their policies. Indicators can target the flow of an ecosystem service (the benefits people actually receive), or the stock of an ecosystem service (the capacity of the ecosystem to deliver a service). Ultimately, information on both stocks and flows are necessary (Layke 2009). Governments can look at what type of ecosystem services indicators can be relevant to existing development sectors. They represent a means of measuring the uses, benefits and impacts of various sectors.

The development of EGS based indicators can take place under the work of multilateral environmental agreements or international conservation organizations. The CBD for example has put in place a work programme to accelerate and guide the development of indicators. The Biodiversity Indicators Partnership is trying to enhance cooperation between concerned organizations to help develop ecosystem based indicators. Other active initiatives are the WWF Living Planet Index and the Ecological Footprint for further information on ecosystems. It is possible to find indicators on provisioning services, but the development of indicators on non-tangible services (regulating, supporting and cultural dimensions) is still in its early stages. Assembling data and indicators is needed to build knowledge in terms of all types of EGS services.

Although ecosystem indicators can contribute information to support policy and budget planning purposes, assessing the success of environmental policy efficiency can be challenging. The problem of monitoring is particularly acute in the environmental arena. This is due to the complexity of indicators, which span over a multitude of disciplines, and the lack of statistical data. Inadequate data and poor monitoring frameworks have been identified as one of the main weakness to follow up the state and uses of ecosystems. The environment as a cross-cutting issue remains challenging to measure in terms of what is being spent and the results achieved. However, notwithstanding existing challenges, building evidence based information in terms of EGS is necessary for reinforcing adequate environmental budget allocations, which depends directly on the availability of monitoring data.

5.2.2 Financial Planning — Public Environment Expenditure Management and Reviews

An increase in environmental budget allocations can be best justified through valid statistics and comparative data. Public environmental expenditure management and reviews (PEEM and PEER) are measures for organizing and monitoring the impact of environmental finances. They offer means to consolidate and systematically assess the effectiveness, efficiency and equity of green expenditures. The introduction of public environmental expenditures practices relies on sound monitoring and evaluation mechanisms.

Box 52: Examples for Defining and Classifying Environmental Expenditure

- Control of outdoor air pollution;
- Water supply, sanitation, and hygiene;
- Reduction of vulnerability to natural disasters;
- Control of indoor air pollution;
- Control of soil degradation;
- Watershed and water resources management;
- Control of deforestation; reforestation;
- Protection of biodiversity, landscape, and national protected areas;
- Public space and urban environmental management;
- Wastewater treatment;
- Hazardous waste management;
- Municipal solid waste disposal;
- Mitigation of emissions of greenhouse gases and ozone-depleting substances;
- Other environmental protection expenditures.

Source: Markandya, Hamilton and Sanchez 2006

Public Environmental Expenditure Reviews (PEERs) provide tools for analyzing in detail the sources, destinations, and effectiveness of environmental resources. They can offer planning and finance ministry officers an understanding of the type and effectiveness of environmental expenditures per category of investment. PEERs are a mechanism to determine the institutional layout of the environmental sector according to the distribution of funding. To be successful, a public environmental expenditure review would require the availability of environmental data in addition to the necessary investment in time and financial resources. PEERs can motivate countries to develop coherent environmental budget lines and to build an improved understanding of environmental spending and investments.

An environment ministry introducing PEER can use related financial figures for benchmarking performance in relation to other ministries and to environment ministries from other countries. For experts from Planning and Finance Ministries, information obtained through these budget management and assessment practices would build an understanding of where additional green funds might be necessary and reveal the impact of investments in environmental initiatives and infrastructures (see box 53). Furthermore, these measures can support the institutional framework by promoting transparency and identifying broader sectoral reforms to enhance environmental performance.

Box 53: Tanzania — Outcomes-based Planning and Public Environmental Expenditure Review

[...] the Tanzanian government's 2004 Public Environmental Expenditure Review [...] proved to be a critical turning point in highlighting the considerable potential of environmental resources to contribute to revenue, the significant under-pricing of environmental services, and very low revenue collection in Tanzania.

Source: Cottrell *et al.* 2008

In summary, conducting a PEER would respond to a set of administrative and performance assessment needs (Markandya *et al.* 2006) related to environmental expenditures by:

- Reviewing environmental budgeting mechanisms to introduce clear outputs and targets;
- Identifying the levels and trends in environmental expenditures in comparison to total government expenditures;
- Improving capacity to trace environmental expenditures;
- Preparing a detailed breakdown of environmental expenditures and their classification by clear categories;
- Enhancing analysis of environmental expenditures with calculations allowing for comparisons with other sectors and countries;
- Enhancing access and availability of environmental data needed to build coherent PEERs;
- Enhancing capacity to determine environmental expenditure gaps;
- Enhancing capacity to determine potential new environmental income sources.

However, experience with PEERs is still limited. PEERs have usually been *ad hoc* documents, and as such any current definition of PEERs must be rather broad (Swason, AuPhil and Lundethors 2003). The use of these reviews is at an early stage and at present it remains difficult to track down expenditures beyond the core environmental agencies (Bird and Cabral 2007).

Coupled to PEERs is the introduction of Public Environmental Expenditure Management (PEEM) practices. Developing countries can introduce these skills to efficiently and effectively manage their environmental expenditures. The OECD in 2006 provided set of good practices related to PEEM. These can vary according to the needs and the institutional set-up of a given country, allowing some of the measures to be skipped or adapted (see box 54).



Box 54: Best Practices in Public Environmental Expenditure Management

Checklist 1	Performance in Terms of Environmental Effectiveness	Checklist 2	Performance in Terms of Budgetary Good Practice	Checklist 3	Performance in Terms of Management Efficiency
Principle 1	Additionality and consistency with other environmental policy instruments;	Principle 1	Fiscal integrity of revenues;	Principle 1	Sound governance;
Principle 2	Well-defined programming framework;	Principle 2	Avoid constraints to efficiency;	Principle 2	Professional executive management;
Principle 3	Clear identification of environmental outcomes;	Principle 3	High standards of fiscal discipline;	Principle 3	Sound project cycle management;
Principle 4	Maximize environmental effect from available funds;	Principle 4	Accountability and transparency;	Principle 4	Fair and unbiased relations with external stakeholders;
Principle 5	Leverage additional finance.	Principle 5	Collection of revenues and public procurement separated from expenditure Management.	Principle 5	Effective management of financial products and related risks.

Source: OECD 2006

5.3 Lessons Learned and Adaptive Management

Implementation, is part of the policy and budget development process, but does not constitute a last step within a sequence of linear planning measures. On the contrary, implementation constitutes a set of actions within an iterative process whereby lessons from the field feed into planning processes. Implementation, like the policy and budget planning process, should remain flexible and open to adjustments. Capturing and sharing lessons learned will reinforce knowledge about the environment and its role, allowing a better integration and enhancement of planning process and implementation measures when necessary.

5.3.1 Lessons Learned

Adaptive Management relies on mechanisms encouraging cooperation and information exchange. These are needed to reinforce trust and to build new knowledge, while sharing lessons learned between the different stakeholders. Development strategies are reinforced based on continuous monitoring, information flow and analysis. To generate informed decisions for the design and implementation of sustainable development strategies at all levels (national, regional, global), this ‘ecosystem services knowledge base’ needs to be constantly updated and consolidated. The development of expert networks and knowledge sharing platforms can facilitate the exchange of information between government agencies (and other stakeholders) with interests and activities linked to natural resources and conservation. For instance, a biodiversity and ecosystem clearing house mechanism can accelerate the use and development of EGS knowledge. Identifying success stories from the ground and collecting new data can contribute to the gradual integration of environmental benefits into national development and poverty strategies. One example is the Clearing-House Mechanism (CHM) of the Convention on Biological Diversity which has been established further to *Article 18.3* of the Convention (see box 55). Its mission is to contribute to the implementation of the Convention through the promotion and facilitation of technical and scientific cooperation among Parties, other Governments and stakeholders. The Strategic Plan of the Clearing-House Mechanism identifies three major goals:

- The promotion and facilitation of technical and scientific cooperation;
- The promotion and facilitation of information exchange among Parties, other Governments and stakeholders;
- A fully operational mechanism with participation of all Parties and an expanded network of partners.

Box 55: China — Biodiversity Clearing House Mechanism

China is one of the ‘megadiverse’ countries of the world, and is therefore rich in biodiversity information. The decision making on biodiversity conservation and sustainable utilization demands sufficient and accurate data and information which covers living organisms, as well as related natural background and human activities. It is estimated that 152 biodiversity databases have been developed in China, mainly distributed in the thematic information categories of forestry, nature reserve, forest ecosystem, animal, plant, crop germplasm resource, traditional Chinese medicine, water resource, geology/geography, and climate/meteorology, etc.

Source: Xu, Wang and Sun 2000

5.3.2 Adaptive Co-Management

The different EGS approaches and initiatives (policy and budget planning approaches/tools) presented in this document can be optimized through adaptive management or adaptive co-management. The latter refers to multi-level and cross-organizational management of ecosystems and focuses on the adaptive capacity of social-ecological systems to deal with ecological changes, uncertainty and surprise. This approach combines the dynamic learning characteristic of adaptive management with the linkage characteristic of collaborative management. Adaptive co-management uses processes of monitoring, interpreting, and responding to ecosystem feedback at multiple scales to build knowledge. Knowledge for dealing with social and ecological system dynamics can be dispersed among individuals and organizations in society and requires social networks that span multiple levels in order for actors to draw on dispersed sources of information. Adaptive governance builds on adaptive co-management to focus on establishing multi-level governance that creates the institutional, economic and political structures to build resilience in social-ecological systems (Duraiappah *et al.* 2008). Strengthening the integration between science and policy can contribute to better development planning. However, as humans we need to be also aware of some of the broader limits and uncertainties that lie behind the transformation of ecosystems.

“For us, it is always good policy to leave alone what we do not understand. Not only us humans depend on forests, but all life depends on them. We let things be, and let the forests grow naturally. This is our approach. All your science will not save you if you continue to take away what is there and what keeps us here. I know that everything depends on everything...this is the best science I can give you.”

—Innu Elder Simon Michel



Flickr.com/Dick Rochester



SECTION 5 SUMMARY		
Concept/Issues Overview	Definition/Details	Some Facts/ Recommendations
Developing Capacity and Raising Awareness	The success of policy choices can be hampered by a lack of capacity to effectively implement identified environmental goals.	Developing Capacity and awareness are on-going processes.
Raising Awareness	The process of integrating ecosystem goods and services within development policies relies on a good dissemination of knowledge concerning the role played by ecosystems.	EGS awareness should motivate stakeholders to maintain or to turn towards greener initiatives without fear of losing economic advantages or access rights. It is desirable for governments to build awareness that highlights realistic targets.
Developing Capacity	<p>In the context of EGS, capacity development involves a broad set of measures that can vary from one country to another according to the types of needs (resources, knowledge, technologies, etc.), the context and state of ecosystems and biodiversity.</p> <p>Staff in sector ministries and ministries of finance and planning often lack sufficient understanding of environmental investments and their economic benefits. The end result being a chronic under-funding of environmental programmes and a lack of environmental mainstreaming.</p>	<p>The preparation of guidelines for designing environmental programmes can and should involve the ministry of finance staff from the outset of the process.</p> <p>Capacity building can also involve reinforcing the ability of institutions in adoption of the ecosystem approach and complementary strategies and tactics such as EGS inclusive strategic environmental assessment, environmental impact assessment, and mainstreaming EGS within development planning.</p> <p>However as EGS is an emerging field there are still gaps in terms of arguments and knowledge, which can slow the integration of ecosystem services within policies. New literature from the CBD as well as other institutions focusing on EGS best practices and biodiversity mainstreaming are constantly being developed and most are accessible for free.</p>
Policy and Budget EGS Based Monitoring	Adaptive management relies on monitoring activities to evaluate the performance of environmental initiatives and as a means for re-adjusting policies.	The perspective of monitoring and developing EGS based indicators is one of the necessary components in building understanding about ecosystems.
Policy Indicators	The Millennium Ecosystems Assessment identified the lack of ecosystem based indicators as one of the main challenges to be addressed in helping governments integrate ecosystem goods and services dimensions in their policies. Inadequate data and poor monitoring frameworks have been identified as one of the weakness in developing countries. The environment as a cross-cutting issue remains challenging to measure in terms of what is being spent and the results achieved.	<p>► 14% of the targets of the second PRSP of Tanzania are related to environment and natural resources.</p> <p>Policies can be assessed through the introduction of environmental indicators that are linked to development objectives.</p> <p>Performance Assessment Frameworks (PAF) can be used to evaluate the progress of development/ poverty reduction strategies. PAF including environmental indicators can help communicate to policy-makers the condition, trends and rate of change in ecosystem services and their contribution to development.</p>

SECTION 5 SUMMARY

Concept/Issues Overview	Definition/Details	Some Facts/ Recommendations
Financial Planning - Public Environment Expenditure Management and Reviews	An increase in environmental budget allocations can be best justified through valid statistics and comparative data. Public environmental expenditure management and reviews (PEEM and PEER) are measures for organizing and monitoring the impact of environmental finances.	Public Environmental Expenditure Reviews provide a tool for analyzing the sources and destinations of environmental resources. PEERs can motivate countries to develop coherent environmental budget lines and to build an improved understanding of environmental spending. Developing countries can introduce Public Environmental Expenditure Management practices, as skills to efficiently and effectively manage their environmental expenditures.
Lessons Learned and Adaptive Management	Implementation is part of the policy and budget development process, but should not be regarded as the last step within a linear sequence of measures.	Continually capturing and sharing lessons learned will reinforce knowledge about the environment and its role, hence achieving better integration of planning process and implementation measures.
Lessons Learned	Development strategies are improved based on continuous monitoring, information flow and analysis. To generate informed decisions for the design and implementation of sustainable development strategies at all levels (national, regional, global), the knowledge base on ecosystem services needs to be constantly consolidated.	Promoting the development of expert networks and knowledge sharing platforms can facilitate the exchange of information between government agencies (and other stakeholders) with interests and activities linked to natural resources and conservation. One tool to help share biodiversity related information is the Clearing-House Mechanism (CHM) of the Convention on Biological Diversity.
Adaptive Co-Management	EGS approaches and initiatives are optimized through adaptive management or adaptive co-management.	Whenever possible, use processes of monitoring, interpreting, and responding to ecosystem feedback at multiple scales to adjust policies and build knowledge.





Appendix I: Web Based Resources

Select weblinks on Ecosystem Goods and Services:

Poverty Environment Partnership:
<http://www.povertyenvironment.net/>

Poverty Environment Initiative:
<http://www.unpei.org/>

Food and Agriculture Organization - Pro-poor
Rewards for Environmental Services in Africa:
<http://www.fao.org/es/esa/PESAL/PESmaterials7.html>

International Institute for Environment and Development:
<http://www.watershedmarkets.org/casestudies.html>

Katoomba Group:
<http://www.katoombagroup.org/>

The Natural Capital Project:
<http://www.naturalcapitalproject.org/home04.html>

International Institute for Environment and Development:
<http://www.environmental-mainstreaming.org/>

International Development Research Centre
— Environmental Economics:
www.idrc.ca

Center for International Forestry Research
http://www.cifor.cgiar.org/pes/_ref/home/index.htm

Ecosystem Goods and Services Capacity Building:

Economy and Environment Program
for Southeast Asia (EEPSEA)
www.eepsea.org

South Asian Network for Development and
Environmental Economics (SANDEE)
www.sandeeonline.org

Latin American and Caribbean Environmental
Economics Program (LACEEP)
www.laceep.org

Center for Environmental Economics
and Policy in Africa (CEEPA)
www.ceepa.co.za

Ecosystem Goods and Services Valuation:

Environmental Valuation Reference Inventory:
<http://www.evri.ca>

InVEST:
<http://invest.ecoinformatics.org/>

World Commission on Protected Areas Economic
Valuation of Protected Areas Task Force
http://www.iucn.org/about/union/commissions/wcpa/wcpa_what/wcpa_capacity/wcpa_economic/

Case Studies on the Web:

Conservation International Ecosystem Services Map:
<http://www.consvalmap.org/>

Nature Valuation & Financing Case Base:
<http://www.eyes4earth.org/casebase>

International Institute for Environment and Development:
<http://www.watershedmarkets.org/casestudies.html>

Finance Initiatives:

UNEP - Finance Initiative:
<http://www.unepfi.org/>

Appendix II: Examples of Country Legislation

Algeria	National Spatial Planning and sustainable development law
	Law for the protection of mountain zones in the context of sustainable development. Adopted 23, June 2004
	Various new laws and regulations (some still being developed) phytosanitary, marine, environment, mountains, green spaces, spatial planning (2001), renewable energy (2004), protected areas.
	Proposed new law on ABS; law on collection, circulation and utilization of biological resources and associated knowledge as a precursor to regulations on ABS
	New law proposed for an exhaustive protection of national flora (549 taxons)
	In 2009 Algeria passed a law expanding the list of species whose conservation is of national interest
	2003 Law for the protection of the environment in the context of sustainable development – purpose is to better integrate biodiversity concerns into strategies and action plans of economic activities
Bhutan	Adoption of EIA Act 2001 and Biodiversity Act 2003.
	The Constitution requires the Government to ensure that a minimum of 60% of Bhutan’s total land area is maintained under forest cover for all time.
	The National Environment Strategy called the “Middle Path” addresses possible impacts from key proposed development activities (hydropower, industrial and agricultural development).
Cambodia	A new Fishery Law was adopted in 2006 which requires fishery management based on the ecosystem approach and gives emphasis to conservation of fish habitats. 8 fish sanctuaries have been established at national level. Community Fisheries (268 sites) have been established to facilitate conservation of habitats and sustainable use of fishery resources.
	A number of laws have been adopted in recent years, such as PA Law, Biosafety Law, Water Resources Management Law and the Law on Crop Seed Management and Rights of Plant Breeders.
	Organizational Law on sub-national administration adopted in 2008 gives more responsibility for sub-national councils to oversee local development and natural resource management.
	A new Fishery Law adopted in 2006 requires fishery management based on the ecosystem approach and gives emphasis to conservation of fish habitats. 8 fish sanctuaries have been established at national level. Community Fisheries (268 sites) have been established to facilitate conservation of habitats and sustainable use of fishery resources.
Spain	Law 42/2007 provides for the creation of a Spanish Inventory of Traditional Knowledge related to Natural Patrimony and the conservation and sustainable use of the biodiversity and geological diversity.
	In 2009, a Royal Decree to develop the Spanish Catalog of invasive alien species, which include those species that pose a serious threat to native biodiversity was issued
	A new policy framework adopted as part of Law 42/2007 on Natural Heritage and Biodiversity adapts existing state legislation on nature conservation and biodiversity to the spirit of the Convention. Law 42/2007 came into force in December 15, 2009. Law 42/2007 will incorporate new instruments such as a Strategic Plan of the State Natural Heritage and Biodiversity to guide biodiversity priorities.
	The Environmental Impact Assessment and Strategic Environmental Assessment now join Law 26/2007 as basic tools of sectoral integration for environmental responsibility.
	In 2008 the Environmental Assessment Law was approved, which aims to regulate, clarify and harmonize the provisions on environmental impact assessment.
Morocco	Put in place a Secretary of State for Environment with a Biodiversity “cell” and a National Biodiversity Committee
	Elaborated various pieces of legislation including protection of the environment from pollutants, valuation of the environment, protected areas, and environmental impact assessment.



Lebanon	Ratification of Law on the Protection of Environment, Law of Hunting, draft law regulating Access and Benefit Sharing, draft framework law for protected areas, draft EIA and SEA decrees, draft biosafety decree.
	Increase in number of protected areas/ but need proper management and monitoring
	Development of major strategies and plans: <ul style="list-style-type: none"> ▪ National Strategy for Forest Fires ▪ National Master Plan for land Management ▪ National Action Plan for Protected Areas (NAPPA) ▪ National Action Plan for combating degradation and desertification ▪ National Reforestation Plan (NRP) ▪ National Biosafety Framework
	Progress toward community-based nature conservation system
	Integration of environmental concepts, biodiversity conservation and sustainability into the gathering, processing and marketing of globally significant Medicinal and Aromatic Plants (MAPs) in Lebanon; into the law of hunting through the incorporation of sustainable hunting approach; into different levels of education and schools curriculum, EIA, SEA, agrobiodiversity, agriculture policy and major sectors of development. Biodiversity considerations have been indirectly linked to Climate Change impact, combating desertification, Ramsar sites and World Heritage sites.
	Law for the Protection of the Environment 2002 includes principle of biodiversity protection.
	EIA and SEA decrees – all major development and infrastructure projects since 2002 require EIA; major plans require SEA.
	“National Reforestation Plan” prepared by the Ministry of Environment in 2001 / refers specifically to the CBD. Only allows use of indigenous forest species, no alien species. Prohibits land preparation techniques that may cause harm to or loss of biodiversity
	“National Strategy for Forest Fires” 2009 officially endorsed by council of ministers; involves various departments.
	Hunting Law 2004 integrates sustainable hunting; refers explicitly to biodiversity convention; defines hunting season; special bans for certain species; establishes breeding centers; prohibition of nest snatching, taking, destroying, selling, etc.
	MoU between ESCWA (regional UN commission) and CBD signed in 2007 to promote mainstreaming of biodiversity topics into sustainable development and socio-economic projects.
Draft framework law for protected areas, draft EIA and SEA decrees, draft biosafety decree.	
Sri Lanka	The Fauna and Flora Protection Ordinance No. 2 of 1937 and subsequent amendments including Act of 2009. The Department of Wildlife Conservation is primarily responsible for the implementation of this law (FFPO), which recognises six categories of wildlife reserves. This Act, besides protecting animal and plant life within the national reserves, has provision to protect certain categories of animals and plants wherever they are found and states the penalties for violation of the law. For most faunal groups there is a negative listing so that most species under the vertebrate groups are protected. The Act also lists penalties for violation of the law. However, enforcement of this Act remains weak with respect to protection of listed species. In contrast, the Act requires a permit for export of any wild plant or animal or their parts, and this is enforced by the Customs Department at ports of exit from the country
	The Marine Pollution Prevention Act No.59 of 1981 and amended by the Marine Pollution Prevention Act No.35 of 2008 became effective as of January 1, 2009. The MPPA of 1981 enabled the establishment of the Marine Pollution Prevention Authority (MPPA) and provided for the prevention, reduction and control of pollution in Sri Lankan waters, and gave effect to international conventions for the prevention of pollution of the sea to which Sri Lanka is a signatory. The 2009 revision of this Act has strengthened the MPPA and renamed it as the Marine Environment Protection Agency.
Philippines	In January 2008 the Supreme Court designated 84 branches of first-level courts and 31 branches of second-level courts as special Environmental Courts or “green courts” to handle cases involving violations of environmental laws. Previously, A number of executive or administrative orders were issued to establish task forces that were mandated to look into environmental crimes.

Djibouti	<p>Biodiversity protection forms an integral part of <i>Law on the Orientation of Economic and Social Development for period of 2001-2010, the Poverty Reduction Strategy (2003), the national initiative for social development (INDS) and the MDGs</i></p> <p><i>Environmental Framework Law (2001)</i> includes procedure for EIA and regulations regarding transport of dangerous products. The law also now includes provisions on creation of terrestrial and marine protected areas and the protection of biodiversity (2004).</p>
Japan	<p>As part of Japan's Biodiversity Basic Law local governments are encouraged to develop local biodiversity strategies. To support local public authorities in this task the Japanese Ministry of the Environment has developed guidelines on the development of local biodiversity strategic action plans. These guidelines contain information on why local biodiversity strategies are important, provides an overview on the development, implementation and monitoring of local biodiversity strategies and provides guidance on how to ensure participation in the development of the strategy and references pieces of relevant legislation and case studies.</p>
Madagascar	<p>Decree n°2003-439 puts in place environmental department ("cellules") in each of the government's ministries.</p>
Poland	<p>A new act on ecological farming was introduced in 2004 that regulates, among other things, the conditions for farming production and food processing with the use of ecological methods, and specifies the system of control and certification, along with requirements for ecological product circulation and marking.</p> <p>The original Polish NBSAP, covering all the sectors of the national economy, was developed between 1996 and 1998, and adopted in 2003. However, due to changes that occurred mainly as a result of Poland's accession to the European Union, and alignment of national environmental policies with those of the EU, Poland adopted an updated version of the NBSAP in 2007. This amended document comprises an Action Plan for the 2007-2013 period and stresses the conservation of biological diversity in respect of Poland's social and economic development needs as its primary objective. It also refers to the 2010 Biodiversity Target and Millennium Development Goals.</p> <p>National Strategy for Conservation and Sustainable Use of Biological Diversity and Action Plan (2007-2013)</p> <p>Polish Act on Nature Conservation (2004)</p> <p>Framework Convention for the Protection and Sustainable Development of the Carpathians. The second COP of the Carpathian Convention adopted a Protocol on Conservation and Sustainable Use of Biological and Landscape Diversity.</p> <p>Act on Sharing Information on the Environment and its Protection, Involvement of Society in Nature Conservation and on Environmental Impact Assessments (2008).</p> <p>In November 2008, amendments to the Act on Nature Conservation and other legislation were adopted to better address issues related to alien species.</p> <p>In spite of the fact that a legal framework for alien species has been significantly improved, progress has not been satisfactory in terms of the development of operational documents.</p> <p>Significant progress has been made in enhancing the role of environmental impact assessments as an important instrument to limit negative pressures on protected areas in planned economic undertakings related to the environment. (Appendices, p. 25). Recognizing the need to increase the efficiency of the EIA system, especially in regard to biological diversity protection issues, and to align EIA requirements with those of the EU, Poland adopted the Act on Sharing Information on Environment and its Protection, Involvement of Society in Nature Conservation, and on Environmental Impact Assessment, in 2008. Through this Act, a new efficient system for supervising EIA procedures was created, comprised of a General Directorate for Environmental Protection and regional directorates for environmental protection responsible for environmental impact issues and the protection of Natura 2000 network. The duties of the newly appointed bodies are to foster cooperation with local governments, environmental organizations, other nature and environment protection bodies, the European Commission and foreign institutions and organizations, as relates to environmental assessments, investment procedures and nature protection. Moreover, the Act's provisions significantly strengthened the role of public consultations in EIA procedures. This modified EIA procedure also introduced the requirement for repeated assessments in undertakings that could considerably impact the environment (e.g. linear infrastructure investments).</p>



<p>European Community</p>	<p>Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage establishes a framework for environmental liability based on the 'polluter pays' principle, with a view to preventing and remedying environmental damage. The European Commission monitors progress on the transposition of the Directive. 19 EU Member States have notified complete transposition of the Directive.</p>
	<p>Rural Development Article 39 (1)-(4) of Regulation (EC) No 1698/2005, and Article 27 of Regulation (EC) No 1974/2006 offer the possibility to promote agri-environment measures that support the rearing of 'farm animals of local breeds indigenous to the area and in danger of being lost to farming', and the preservation of 'plant genetic resources naturally adapted to the local and regional conditions and under threat of genetic erosion'. Article 28 of Regulation 1974/2006 also supports the conservation of genetic resources in operations not covered by the above-mentioned measures by supporting the preservation of endangered animal and plant genetic resources.</p>
<p>Uganda</p>	<p>The Constitution of Uganda recognizes and makes special provisions for the environment and natural resources. The Constitution has a number of Articles which are relevant to the CBD, for example, <i>Article 237(2)(b)</i> mandates Parliament to make laws which authorize the central government or local governments, to hold in trust for the people, and protect natural lakes, rivers, wetlands, forest reserves, game reserves, and national parks, and to reserve land for ecological and tourist purposes for the common good of all citizens.</p>
<p>United Republic of Tanzania</p>	<p>Biodiversity issues have been mainstreamed into the National Strategy for Growth and Poverty Reduction (NSGRP)</p>
<p>Kenya</p>	<p>The Seeds and Plant Varieties Act has measures to regulate the genetic quality of seeds and plants in Kenya by detailing provisions on seed testing, transactions in seeds, prevention of cross-pollination and on plant breeder rights.</p>
<p>Finland</p>	<p>As part of Finland's Land Use and Building Act, adopted in 2000 and since revised, it is possible to designate National Urban Parks as a means of protecting and maintaining the beauty of the cultural or natural landscape, biodiversity or related values in townscapes.</p>
<p>United Kingdom</p>	<p>A reform of the Common Agricultural Policy in 2003 reduced the environmental impact of agriculture by removing incentives to intensify production.</p>
<p>Hungary</p>	<p>Agri-environmental measures will be included under the New Hungary Rural Development Plan, which will be implemented in 2009. The plan will help to find a suitable balance between compulsory conservational requirements and the possibility of voluntary measures; farmers will be eligible for subsidies for biodiversity-supportive measures on about 914,000 ha.</p>
<p>Cambodia</p>	<p>A new Fishery Law was adopted in 2006 which requires fishery management based on the ecosystem approach and gives emphasis to conservation of fish habitats. 8 fish sanctuaries have been established at national level. Community Fisheries (268 sites) have been established to facilitate conservation of habitats and sustainable use of fishery resources.</p>
<p>Norway</p>	<p>The Management of Wild Marine Resources Act went into force in 2009. The purpose of this Act is to secure a sustainable and socio-economically profitable management of wild marine resources and associated genetic materials and to contribute to securing employment and settlement in coastal communities. (p. 52, chapter II)</p>
<p>Chile</p>	<p>2007 Amended Law on General Principles of the Environment 2007 Law on National System of Certification of Agricultural Organic Products establishes the conditions for the commercialization of organic products and their equivalents 2008 Law on Native Forest Restoration</p>
<p>Tunisia</p>	<p>New Law on Marine Protected Areas (2009) (p. 10)</p>

References and Selected Bibliography

- Agence France Press. (2007). Natural Disasters Four Times More Common, Retrieved December 2009 from: <http://dsc.discovery.com/news/2007/11/26/natural-disasters-warming.html>
- Aguilar Lorena, Gender Makes the Difference - Climate Change And Disaster Mitigation, IUCN
- Alister Doyle. (2009). Climate Change Worsens Disaster Risks for Poor-Un, Retrieved December 2009 from: <http://www.reuters.com/article/idUSLB776371>
- Anil Markandya, Kirk Hamilton, and Ernesto Sanchez-Triana. (2006). Getting the Most for the Money — How Public Environmental Expenditure Reviews Can Help, Environment Strategy No. 16, September 2006, World Bank, Washington DC, USA
- Anil Netto. (2009). Environment: Back to Traditional Farming to Beat Climate Change, Retrieved December 2009 from <http://ipsnews.net/news.asp?idnews=48783>
- Ayers, R., et al. (1996). Natural Capital, Human Capital and Sustainable Economic Growth. Boston: Boston University
- Biodiversity Indicators Partnership (BIP). (2008). Building the Partnership to Deliver the Global 2010 Indicators, Reporting period: July 2007 – December 2008
- Bird Neil and Lidia Cabral. (2007). Green Aid Using General Budget Support For Environmental Benefits, id 21 natural resources highlights (5), Institute for development studies, Brighton, UK
- Bird Neil and Lidia Cabral. (2007). Changing Aid delivery and the Environment Can General Budget Support Be Used to Meet Environmental Objectives? ODI Briefing Paper Issue 17, March 2007, ODI, London, UK
- Bishop, J. et al. (2008). Building Biodiversity Business. Shell International Limited and the International Union for Conservation of Nature: London, UK, and Gland, Switzerland
- Borrini-Feyerabend G. et. al. (2008). Governance as Key for Effective and Equitable Protected Area Systems, IUCN-CEESP, briefing note 8, February 08, CENESTA, Tehran, Iran
- Bunce, M. et al. (2008). Ecosystem Services for Poverty Alleviation: Marine & Coastal Situational Analysis. Synthesis Report. Report for NERC/DFID. November 2008
- Butler, Rhett A. (2005). Deforestation Causes 25% Of Greenhouse Gas Emissions Says FAO, Retrieved December 2009 from: <http://news.mongabay.com/2005/1210-fao.html>
- Butler, Rhett A. (2009). Local and National Consequences Loss of Local Climate Regulation, Retrieved December 2009 from: <http://rainforests.mongabay.com/0902.htm>
- Community Forestry Workshop. (2009). Learning from Community Forestry: Recognizing Rights and Advancing Democratic Forest Governance Globally, Declaration from the Community Forestry International Workshop Pokhara - September 18, 2009, Retrieved December 2009 from: <http://www.communityforestryworkshop.com.np/declaration/declaration.htm>
- Costanza Robert et al. (1997). The Value of the World's Ecosystem Services and Natural Capital, Nature, vol. 387, p. 253-260
- Cottrell Jacqueline et al. (2008). Environmental Fiscal Reform in Developing, Emerging And Transition Economies: Progress & Prospects, GTZ, Eschborn, Germany
- Council of the European Union (EU). (2009). Council Conclusions on Integrating Environment In Development Cooperation, 2953rd Environment council meeting, Luxembourg, 25 June 2009
- Dalal-Clayton Barry and Steve Bass. (2009). The Challenges Of Environmental Mainstreaming Experience Of Integrating Environment Into Development Institutions And Decisions - An Issues Paper Based On A 12 Country Survey And Global Review, IIED, London, UK
- Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). (2008), Macroeconomic Impact of Climate Change: "Opportunities and Challenges" Nusa Dua, Bali, Paper presented at the Bank Indonesia Annual International Seminar August 1-2, 2008
- Diamond Jared. (2003). The Last Americans: Environmental Collapse and the End of Civilization, Harper's Magazine 306 (1837) pp. 43-51
- Diamond Jared. (2005). How Societies Choose to Fail or Succeed, New York: Viking, USA
- Drakenberg, O. et al. (2009). Greening Development Planning: A Review of Country Case Studies for Making the Economic Case for Improved Management of Environment and Natural Resources, OECD Environment Working Papers, No. 5, OECD publishing, Paris, France
- Dugan et al. (Eds). (2003). Advancing Assisted Natural Regeneration in Asia And The Pacific, FAO, Bangkok, Thailand
- Duraippah A. (2004). Exploring The Links- Human Well-Being, Poverty & Ecosystem Services, UNEP/IISD, Nairobi, Kenya
- Duraippah, A. et al. (2008). Ecosystems and Disaster Risk Reduction. United Nations Environment Programme and Stockholm Resilience Center. Background paper for: Global Assessment Report on Disaster Risk Reduction May 2009. ISDR (International Strategy for Disaster Reduction) Secretariat. Geneva. United Nations
- Ecosystem Services Project, What Are Ecosystem Services? Retrieved December 2009 from: <http://www.ecosystemsproject.org/html/overview/index.htm>
- Ecosystem Valuation, Dollar Based Methods, Retrieved December 2009 from: http://www.ecosystemvaluation.org/dollar_based.htm
- Eighth session of the United Nations Forum on Forests. (2009). Resolution on Forests In A Changing Environment, Enhanced Cooperation And Cross-Sectoral Policy And Programme Coordination, Regional And Sub-Regional Inputs, United Nations Forum on Forests, Retrieved December 2009 from: http://www.un.org/esa/forests/pdf/session_documents/unff8/Res_WG1.pdf



- Emerton Lucy et al. (1998). The Present Economic Value Of Nakivubo Urban Wetland, Uganda, IUCN The World Conservation Union, Nairobi, KENYA
- Environment Helpdesk for EC Development Co-operation, Environmental integration in EC development co-operation: an introduction, Retrieved December 2009 from: http://www.environment-integration.eu/component/option,com_docman/Itemid,278/lang,en/
- European Commission (EU). (2008). TEEB Interim Report, Office for the Official Publications of the EU
- European Commission (EU). (2009). TEEB – The Economics of Ecosystems and Biodiversity for National and International Policy Makers – Summary: Responding to the Value of Nature 2009, Office for the Official Publications of the EU
- Falvio Comim. (2008). Poverty and Environment Indicators, Capability and sustainability centre, Cambridge, UK
- Fikret Berkes and Carl Folke. (1992). A Systems Perspective On The Interrelations Between Natural, Human-Made And Cultural Capital, *Ecological Economics*, vol. 5, issue 1, pages 1-8
- Foley, J. A. et al. (2005). Global Consequences of Land Use. *Science* 309 :570-574. Retrieved December 2009 from: <http://www.sciencemag.org/cgi/content/short/309/5734/570>
- Food and Agriculture Organization (FAO), Retrieved December 2009 from: http://newsimg.bbc.co.uk/media/images/42269000/gif/_42269000_seafd_global_loss203gr.gif
- Food and Agriculture Organization - Pro-poor Rewards for Environmental Services in Africa, Retrieved December 2009 from: <http://www.fao.org/es/esa/PESAL/PESmaterials7.html>
- Food and Agriculture Organization (FAO). (1996). Guidelines for Land-Use Planning, FAO, Rome, Italy
- Food and Agriculture Organization (FAO). (2003). The Ecosystem Approach In Practice: Developing Sustainable Forestry In Central Labrador, Canada, Retrieved December 2009 from: <http://www.fao.org/DOCREP/ARTICLE/WFC/XII/0717-C1.HTM>
- Food and Agriculture Organization (FAO). (2004). What is Agrobiodiversity, Retrieved December 2009 from <ftp://ftp.fao.org/docrep/fao/007/y5609e/y5609e00.pdf>
- Food and Agriculture Organization (FAO). (2006). Livestock a Major Threat To Environment, Retrieved December 2009 from: <http://www.fao.org/newsroom/en/news/2006/1000448/index.html>
- Gil Yaron and Judy White (2002), Mainstreaming Cross-cutting Themes in Programme and Sector Aid: The Case Of Environmental Issues, *Natural Resource Perspectives*, issue 77), ODI, London, UK
- Government of Ecuador. (2008). Ecuador Constitution Art. 71 – Art. 74 , Ecuador
- Government of France - Ministère de l'Écologie, de l'énergie, du développement durable, et de la mer. (2005). Charter for the Environment, Retrieved December 2009 from: <http://www.ecologie.gouv.fr/Charter-for-the-Environment.html>
- Government of Madagascar (2006). Madagascar Action Plan 2007-2012, Madagascar
- Government of Mozambique. (2007). Republic of Mozambique: Poverty Reduction Strategy Paper, IMF, Washington DC, USA
- Government of Nepal Ministry of Environment - Science and Technology. (2008). National Capacity Needs Self Assessment for Global Environment Management Project (NCSA)Cross-cutting Analysis Report, MoEST-UNDP-GEF, Kathmandu, Nepal
- Government of South Africa, Working for water webpage, Retrieved December 2009 from: <http://www.dwaf.gov.za/wfw>
- Greenfacts. (2005). Ecosystem Change: 3. How Have Ecosystem Changes Affected Human Well-Being and Poverty Alleviation?, Retrieved December 2009 from: <http://www.greenfacts.org/en/ecosystems/millennium-assessment-2/3-human-wellbeing-poverty.htm>
- Greiber Thomas (Ed.). (2009). Conservation With Justice. A Rights-based Approach, IUCN, Gland, Switzerland
- Gustavo Faleiros, Billion Dollar Jungle, 24 February 2009, Retrieved December 2009 from: <http://www.panos.org.uk/?lid=26487>
- Haigen Xu, Dehui Wang and Xuefeng Sun. (2000). Biodiversity Clearing-House Mechanism in China: Present Status and Future Needs, Retrieved December 2009 from: <http://www.springerlink.com/content/t8220716gk068857/>
- Heather Tallis et al. (2007). An Ecosystem Services Framework To Support Both Practical Conservation And Economic Development, Department Of Biology And Natural Capital Project, Woods Institute for the Environment, Stanford University, Stanford, USA
- Henning Steinfeld et al. (2006). Livestock's Long Shadow - Environmental Issues and Options, FAO, Italy, Rome
- Henry Bahn et al. (2007). Ecosystem Services Working Group: Recommendations for an Integrated, Multi-level, Multi-topic Systems Approach Portfolio for Agricultural Ecosystems Activities, CSREES Ecosystem Services Working Group. (Discussion Paper), Retrieved December 2009 from: http://www.csrees.usda.gov/about/white_papers/whitepapers.html
- Hernán Blanco et al. (2008), Effective Tools and Methods For Integrating Environment And Development: Chile and Latin America, IIED, London, UK
- Ibisch, P.L. and L. Schmidt. (2009). Conservation of tropical forests and climate change mitigation. In: Spatself, P. (Hg.): Sustainable forest management in a changing world: a European perspective. Springer Netherlands (978-90-481-3300-0). 33-51.
- Indigenous and Community Conserved Areas, ICCA Home Page, Retrieved December 2009 from: <http://www.iccaforum.org/>
- Intergovernmental science-policy platform on biodiversity and ecosystem services (IPBES). (2009b). Second ad hoc intergovernmental and multi-stakeholder meeting on an intergovernmental science-policy platform on biodiversity and ecosystem services, Nairobi, 5–9 October 2009, Item 4 of the provisional agenda - Consideration of options to strengthen the science-policy interface for biodiversity and ecosystem services

- International Development Research Centre. (2003). Mercury contamination in the Amazon, Retrieved December 2009 from: http://network.idrc.ca/en/ev-34034-201-1-DO_TOPIC.html
- International Federation of Red Cross and Red Crescent Societies. (2002). Mangrove planting saves lives and money in Viet Nam, Retrieved December 2009 from: <http://webapps01.un.org/nvp/frontend!policy.action?id=407>
- International Institute for Sustainable Development (IISD). (2005). Biodiversity: Science and Governance, A Daily Report of the International Scientific Conference "Biodiversity: Science and Governance", VOLUME 100, Issue 4, Friday, 28 Jan 2005, Winnipeg, Canada
- International Network for Bamboo and Rattan, Global Bamboo Housing Programme, Retrieved December 2009 from: <http://www.inbar.int/Board.asp?Boardid=67>
- International Union for Conservation of Nature (IUCN). (2007). Environmental Fiscal Reform in Abbottabad EFR, Poverty Alleviation and Environmental Conservation, IUCN, Islamabad, Pakistan
- Jacques Langlois. (2008). L'aide Humanitaire Tendances Enjeux Défis, OXFAM
- Jeremy Hance, A Solution to Worldwide Fisheries Collapse? (2008). Retrieved December 2009 from: http://news.mongabay.com/2008/0918-hance_fish.html
- Joint Liaison Group of the Rio Conventions (JLG). (2007). Adaptation Under the Frameworks of the CBD, the UNCCD and the UNFCCC, Published by the Rio Conventions Retrieved December 2009 from: http://www.unccd.int/publicinfo/factsheets/pdf/adaptation_eng.pdf
- Kolhoff Arend et al. (2006). Biodiversity in EIA and SEA - Voluntary guidelines on biodiversity- Inclusive impact assessment, Commission for Environmental Assessment, The Netherlands
- Lara Silvia, Gender Makes the Difference – Poverty and Environment, IUCN
- Layke, Christian. (2009). Measuring Nature's Benefits: A Preliminary Roadmap for Improving Ecosystem Service Indicators, WRI-Working Paper, World Resources Institute, Washington DC, USA
- Lester R. Brown. (2009). Shrinking Forests: The Many Costs, Lester Brown, Is humanity doomed by its own avarice & greed?, Retrieved December 2009 from: http://www.forestcouncil.org/tims_picks/view.php?id=1581
- Luttrell Cecilia and Innocent Pantaleo. (2008). Budget Support, Aid Instruments And The Environment: The Country Context Tanzania Country Case Study, ODI London, UK
- Millennium Ecosystem Assessment. (2005). Ecosystems and Human Well- Being: Current State and Trends: Findings of the Condition and Trends Working Group. Washington DC. Island Press.
- Morten Andersen. (2009). International Organization for Migration IOM: 200 Million Environmental Migrants By 2050, Retrieved December 2009 from: <http://en.cop15.dk/news/view+news?newsid=1395>
- Neil Bird and Lidia Cabral. (2007). Changing Aid Delivery And The Environment Can General Budget Support Be Used To Meet Environmental Objectives?, ODI Briefing Paper Issue 17, March 2007, ODI, London, UK
- Nigel Brett et al. (2004). Case Study Providing The Poor With Secure Access To Land In The Hills Of Nepal, International Fund For Agricultural Development, Retrieved December 2009 from: www.ifad.org/events/reducingpoverty/nepal_full.pdf
- Nils Boesen, Jean de la Harpe and Erma Uyteswaal. (2008). Water SWAPs in Motion Meeting The Challenges In A Complex Sector - paper produced for the Joint Learning Programme on Sector Wide Approaches
- Organization for Economic Co-operation and Development - DAC Network on Environment and Development Co-operation (2008). Strategic Environmental Assessment and Ecosystem Services, OECD, Paris, France
- Organization for Economic Co-operation and Development (OECD). (1999). What are National Strategies for Sustainable Development?, Retrieved December 2009 from: http://www.earthsummit2002.org/es/national-resources/about_nssd.html
- Organization for Economic Co-operation and Development (OECD). (2001). Strategies For Sustainable Development: Practical Guidance For Development Co-Operation, OECD, Paris, France
- Organization for Economic Co-operation and Development (OECD). (2005). Environmental Fiscal Reform for Poverty Reduction, Paris, France
- Organization for Economic Co-operation and Development (OECD). (2006). Recommendation of the Council on Good Practices for Public Environmental Expenditure Management, 8 June 2006, Retrieved December 2009 from: www.oecd.org/dataoecd/10/46/38787377.pdf
- Organization for Economic Co-operation and Development (OECD). (2009). Natural Resources and Pro-Poor Growth: The Economics and Politics, DAC Guidelines and Reference Series - A Good Practice Paper, OECD Publishing, Paris, France
- Organization for Economic Co-operation and Development (OECD). (2009). Integrating Public Environmental Expenditure within Multi-year Budgetary Frameworks, A background report for the joint Environment and Development Task Team on Governance and Capacity Development for Natural Resource and environmental Management, Paris, France
- Palerm, J., Ledant, J.-P., and Brinn, P. (2006). Addressing Environmental Objectives In The Context Of Budget Support, ODI London, UK
- Payments For Environmental Services From Agricultural Landscapes, Retrieved December 2009 from: <http://www.fao.org/es/esa/PESAL/PESmaterials7.html>
- PEP 11th meeting, <http://www.unpei.org/PDF/11thPEP-Meeting.pdf>
- Petersen Caroline and Brian Huntley. (2005). Mainstreaming Biodiversity in Production Landscapes, Global Environment Facility, Working Paper 20, November 2005



- Philippine Council for Sustainable Development. (2009). 50th PCSD Meeting Approves the Enhanced Philippine Agenda 21 (EPA 21), Retrieved December 2009 from: <http://pcsd.neda.gov.ph/front.asp?sid=15>
- Pisupati Balakrishna. (2007). Ecosystem Services and Rural Poverty Reduction Issues, Challenges and Opportunities, UNEP, Retrieved December 2009 from: <http://www.cbd.int/doc/external/external-meetings/trondheim-05-20-pisupati-en.pdf>
- Poverty Environment Initiative. (2008). Making the Economic Case: A Primer on the Economic Arguments for Mainstreaming Poverty-Environment Linkages into National Development Planning, Poverty Environment Initiative, Kenya
- Pro-poor Rewards for Environmental Services in Africa (PRESA). 2009. PRESA annual meeting and training kicks off, March 2009, Retrieved December 2009 from: <http://presa.worldagroforestry.org/blog/category/news/events/>
- Ranganathan Janet et al. (2008). Ecosystem Services: A Guide for Decision Makers, World Resources Institute, Washington DC, USA
- Ranganathan Janet, Irwin Frances and Cecilia Procopé Repinski. (2009). Banking on Nature's Assets — How Multilateral Development Banks Can Strengthen Development by Using Ecosystem Services, World Resources Institute, Washington DC, USA
- Report of the international expert group meeting on extractive industries. (2009). Indigenous Peoples' Rights and Corporate Social Responsibility, 2009, New York, USA
- Rhett A. Butler. (2008). Carbon Traders, Not Conservationists, Could Save Cameroon Rainforest, Retrieved December 2009 from <http://news.mongabay.com/2008/0215-cameroon.html>
- Secretariat of the Convention on Biological Diversity, 2010 Biodiversity Target, Retrieved December 2009 from: <http://www.cbd.int/2010-target/goals-targets.shtml>
- Secretariat of the Convention on Biological Diversity, World Tourism Organization and The United Nations Environment Programme. (2009). Tourism for Nature and Development: A Toolkit of Good Practices, UNEP, Montreal, Canada
- Secretariat of the Convention on Biological Diversity. (2006). Global Biodiversity Outlook 2, UNEP, Montreal, Canada
- Secretariat of the Convention on Biological Diversity. (2009). Forestry, Conservation and Poverty Alleviation: A Toolkit of Good Practices. Montreal, Canada
- Sheng Fulai. (1997). Public Environmental Expenditures: A Conceptual Framework, Macroeconomics for Sustainable Development Program Office (MPO)-World Wide Fund For Nature, Retrieved December 2009 from: http://www.panda.org/about_our_earth/all_publications/?3881/Public-Environmental-Expenditures-A-Conceptual-Framework-Sheng-Fulai
- Shepherd, Gill. (2004). The Ecosystem Approach: Five Steps to Implementation. IUCN, Gland, Switzerland and Cambridge, UK
- Slootweg R. and Pieter Van Beukering. (2008). Valuation of Ecosystem Services and Strategic Environmental Assessment Lessons from Influential Cases, Netherlands Commission for Environmental Assessment, Netherlands
- Smith Gary. (2009). In Ecuador, Nature now has rights, People and the planet, Retrieved December 2009 from: <http://www.peopleandplanet.net/doc.php?id=3480>
- Strengthening Science-Policy Interface on Biodiversity and Ecosystem Services (IPBES). (2009a). Intergovernmental and Multi-stakeholder meeting on an Intergovernmental Science-Policy Interface on Biodiversity and Ecosystem Services, Nairobi, 5-9 October 2009
- Sudmeier-Rieux et al. (eds). (2006). Ecosystems, Livelihoods and Disasters: An Integrated Approach to Disaster Risk Management. IUCN, Gland, Switzerland and Cambridge, UK
- Sudmeier-Rieux Karen and Neville Ash. (2009). Environmental Guidance Note for Disaster Risk Reduction Healthy Ecosystems for Human Security, IUCN, Gland, Switzerland
- Swanson, AuPhil, and Leiv Lundethors. (2003). Public. Environmental Expenditure Reviews: Experience and. Emerging Practice, Environment Strategy Paper No.7, The World Bank, Washington DC, USA
- The Biomimicry Institute, Retrieved December 2009 from: <http://www.biomimicryinstitute.org/>
- Trumper, K. et al. (2009). The Natural Fix? The Role of Ecosystems in Climate Mitigation. A UNEP Rapid Response Assessment, United Nations Environment Programme, UNEPWCMC, Cambridge, UK
- UNEP/GRID-Arendal Maps and Graphics Library. (2005). Linkages Between Ecosystem Services and Human Well-Being, Retrieved December 2009, from <http://maps.grida.no/go/graphic/linkages-between-ecosystem-services-and-human-well-being>
- UNEP/GRID-Arendal Maps and Graphics Library. (2009). Projected Land Use Changes, Retrieved December 2009 from <http://maps.grida.no/go/graphic/projected-land-use-changes>
- UNEP/GRID-Arendal Maps and Graphics Library. (2009b). Linkages and Feedback Loops Among Desertification, Global Climate Change And Biodiversity Loss, Retrieved December 2009 from <http://maps.grida.no/go/graphic/linkages-and-feedback-loops-among-desertification-global-climate-change-and-biodiversity-loss>
- United Nations Conventions to Combat Desertification. (2007). Sector-wide approaches
- Implications for sustainable land management and UNCCD financing arrangements, Case Studies from Kenya and Uganda, n.d.
- United Nations Development Programme-United Nations Environment Programme Poverty-Environment Initiative (UNEP-PEI). (2009), Mainstreaming Poverty-environment Linkages into Development Planning: a Handbook for Practitioners, UNEP, Nairobi, Kenya
- United Nations Development Programme-United Nations Environment Programme Poverty-Environment Initiative. (2008). Making the Economic Case: A Primer On The Economic Arguments For Mainstreaming Poverty-Environment Linkages Into National Development Planning, UNEP, Nairobi, Kenya

- United Nations Development Programme-United Nations Environment Programme Poverty-Environment Initiative. (2009). *Mainstreaming Poverty-environment Linkages into Development Planning: a Handbook for Practitioners*, UNEP, Nairobi, Kenya
- United Nations Economic and Social Commission for Asia and the Pacific (ECOSOC). (2003). *Economic and Social Survey of Asia and the Pacific*, United Nations, New York, USA
- United Nations Economic and Social Council. (2008). *Support Environmentally Sustainable Development Through Reforms to International Trade Policy* United Kingdom, Retrieved December 2009 from: <http://webapps01.un.org/nvp/frontend!policy.action?id=407>
- United Nations Environment Programme. (1992). *Rio Declaration on Environment and Development*, <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=78&ArticleID=1163>
- United Nations Environment Programme. (2007). *Global Environment Outlook (GEO) 4: Environment for Development*. Nairobi. UNEP.
- United Nations Environment Programme. (2008). *Ecosystem Renovation - Bring Them on Back*, Retrieved December 2009 from: <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=548&ArticleID=5938&l=en>
- United Nations Poverty Environment Initiative. (2007). *11th meeting Environmental Improvements for Poverty Reduction and sustainable growth: The Challenges of Implementation- Copenhagen*, Retrieved December 2009 from: <http://www.unpei.org/PDF/11thPEP-Meeting.pdf>
- World Bank. (2002). *A Sourcebook for Poverty Reduction Strategies; Volume 1: Core techniques and cross-cutting issues*, World Bank, Washington DC, USA
- World Bank. (2008). *Assessing the Environmental, Forest and Other Natural Resource Aspects of Development Policy Lending — A World Bank Toolkit*, The World Bank, Washington DC, USA
- World Resources Institute in collaboration with United Nations Development Programme, United Nations Environment Programme, and World Bank. (2008). *A Guide to World Resources 2008: Roots of Resilience-Growing the Wealth of the Poor*, WRI, Washington DC, USA
- World Resources Institute, *Mainstreaming" the Environment in PRSPs: The Unfulfilled Promise*, Retrieved December 2009 from: <http://www.wri.org/publication/content/8045>
- World Resources Institute, Retrieved December 2009 from, http://www.wri.org/artwork/mesi_about_chart.jpg
- World Resources Institute. (2008). *Nature for People's Sake Integrating Ecosystem Services in Public Decision Making*, Power Point Presentation, Retrieved December 2009 from: <http://www.wri.org/publication/ecosystem-services-a-guide-for-decision-makers>
- Worm B, Lotze HK, Myers RA. (2003). *Predator diversity hotspots in the blue ocean*. *Proceedings of the National Academy of Sciences USA* 100:9884-9888
- Wunder Sven.(2005), *Payments for Environmental Services: Some Nuts and Bolts*, CIFOR Occasional Paper No. 42. Center for International Forestry Research, Indonesia
- Yaron Gil and Judy White. (2002). *Mainstreaming Cross-Cutting Themes In Programme And Sector Aid: The Case Of Environmental Issues*, *Natural Resource Perspectives*, issue 77), ODI, London, UK
- Zablon Odhiambo. (2007). *Kenya Creates 'Poverty Map*, *Science and Development Network*, Retrieved December 2009 from: <http://www.scidev.net/en/news/kenya-creates-poverty-map.html>

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