

Economic valuation in western Africa

A report on the valuation of
environmental goods-and-services in Western Africa
as an input into UNEP's GEO-4 report

April 2006

Dr Francis Vorhies
earthmind.net
fvorhies@earthmind.net
+41 44 586 5836



LE BUREAU REGIONAL UICN
EN AFRIQUE DE L'OUEST
iucn.org/places/brao
brao@iucn.org
+226 50 32 85 00 /01

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Economic valuation in western Africa

Executive summary

This report on economic valuation in western Africa has been produced as an input to the forthcoming GEO-4 report of the United Nations Environment Programme. Hence, it remains essentially a draft report. Nevertheless, the report covers a good deal of information on the topic which will be of particular interest to Africans and others who have a passion for western Africa and a commitment to its sustainable development.

The first four chapters provide an introduction to valuation, its potential contribution to decision-making, its methodologies and its limits and challenges. From a western African context – where the capacity to carry out and to apply valuation research is seriously underdeveloped – these chapters present valuation in a non-technical manner showing how valuation research can contribute to sustainable development in the region.

Chapter 5 reviews the limited set of valuation studies – some of which are still in draft – from western Africa. Chapter 6 reviews a larger set of valuation studies from the rest of Africa and Chapter 7 provides some examples of valuation studies from out of Africa as well as links to some useful valuation websites. These chapters provide tangible evidence of the potential role of valuation studies in guiding sustainable development decision-making in western Africa.

Chapter 8 focuses on the options for capacity building with respect to carrying out and applying valuation studies in western Africa. This is followed by a fairly technical chapter which identifies the linkages between valuation in western Africa and two key background documents for the preparation of the GEO-4 report. Though this chapter follows these documents page-by-page, it can be read on its own to get a flavour of how the topic of valuation can relate to GEO-4.

Finally, Chapter 10 provides an annotated bibliography of key valuation documents. In addition to the case studies reviewed in the report, it provides a number of general references on valuation as well as references on biodiversity valuation and water ecosystem valuation. Most of these documents are available on the Internet and can be found through a Google search. Alternatively, upon request, copies can be provided by the author.

1. Introduction to valuation

Can the ecosystems of western Africa be economically valued? For example, what benefits do rainforests, moist mountain forests, dryland forests, and coastal mangrove forests generate and to whom? Are these benefits and the distribution of these benefits sufficient to ensure that the forest will be conserved?

This section provides a general, non-technical overview of the concept of economic valuation and its role in biodiversity conservation and sustainable development. In so doing, it lays out a conceptual baseline for the following sections of this report which reviews valuation work in western Africa as a contribution to UNEP's GEO-4 report.

Economic valuation is one of the tools we can use to assess the benefits of ecosystem conservation as well as how these benefits are distributed among the stakeholders. Through an analysis of benefits and costs, we can begin to understand some of the forces that may be threatening the existence of forests and other ecosystems. We may also find that other forces are there to shape incentives for wise use and sound management. Moreover, through assessing the values of ecosystems, we can better identify the opportunities for using these ecosystems sustainably to promote economic development and alleviate poverty.

A forest ecosystem can be thought of as a business. Who are its customers? In what goods and services are they interested? Perhaps, they are only interested in the land resources under the forest, such as cleared land for farming or the minerals under the ground. Such interests may generate perverse incentives and threaten the health of the ecosystem. An economic or business approach to ecosystem management uses economic valuation as a practical tool to assess potential benefits and costs, to identify potential uses and threats and to address potential incentives and disincentives.

Local communities are a particularly important user group or customers of a forest ecosystem. What goods and services do they want from the forest? Do they demand timber for building materials? Do they need wood to convert into charcoal for fuel? Do the communities harvest non-timber forest products such as fruits, honey, medicinal plants or thatching grasses? Do they want access to forest lands for grazing their livestock or access to watering holes during the dry season? Is the forest a place for perpetuating cultural and spiritual practices inseparable from their lifestyle and beliefs? How can local communities develop a profitable, sustainable relationship with the forest? Should local

communities pay for the ecosystem goods and services they receive from the forest? If so, how can they pay?

The local communities, on the other hand, may pose a threat to the sustainability of the forest ecosystem. Their interest in the forest land for farming and ranching may far outweigh their interest in keeping the forest intact and conserved. If they are to see the forest as a benefit, it must be a tangible benefit to them. How can the local communities become meaningfully involved in the business of conserving the forest? Can conservation offer employment opportunities? Can the communities be compensated for their lack of exploitative access to the forest? Do we make them co-managers of the forest by bringing them into a forest management business as partners or even as shareholders?

What measures will generate incentives for forest conservation? A major threat to conserving ecosystems, including forest, savannah, wetland and marine systems, is the demand to use the land for agricultural or ranching purposes. By identifying the benefits and costs facing local communities from conserving the forest, we will be better able to minimize the threats to and increase the tangible returns from forest conservation.

It may happen that different groups within local communities have conflicting views and uses of the forest resources. Some may prefer farming and ranching, while others may be more interested in timber management and conservation. How do we address the externalities arising from the actions of the different groups? Can we devise fair allocation schemes between competing uses?

In addition to local community customers, there are also actual and potential commercial customers of the forest ecosystem. What goods and services can be harvested sustainably from the forest and sold on the open market? Timber, of course, is a major product. Can the timber be harvested sustainably? Can it generate a fair rent to finance forest conservation? What about commercial sales of non-timber forest products, including medicinal plants, honey and bush meat? Perhaps the forest offers opportunities for tourism or hunting. In addition, are there opportunities for bio-prospecting? Can we commercialize access to genetic resources in a way that promotes ecosystem conservation and equitable sharing of the benefits?

Valuation techniques can be used to assess the benefits of direct uses—both consumptive and non-consumptive uses—of the forests and other ecosystems. These include assessing the direct commercial or market

value of such uses as well as the broader impact of these uses on local and national economies—what economists call the multiplier effects.

How do we address illegal markets for forest products, such as illegal timber trade, as well as trade in threatened and endangered species? These illegal markets are servicing some customers of the forest as well as generating economic benefits. If illegal markets exist, the good news is that there are at least some customers for forest products.

The bad news, of course, is that these markets may undermine forest conservation. Illegal markets probably do not promote sustainable use, and the benefits they generate probably are not equitably shared. This poses a serious challenge to an ecosystem with illegal, but active markets for its products. Is it better to invest resources in closing down this trade and keeping it closed, or in making the trade legal, regulating it, and attempting to manage it sustainably?

Because illegal markets are difficult to monitor, detailed valuation studies may not be possible. Nevertheless, estimates of the value of illegal trade in forest products can indicate the size of the markets and thus the extent of the problem. Such estimates can assist forest managers and policy-makers to decide how to deal with this trade.

We also need to consider the “downstream” or indirect customers of the natural forest. What benefits accrue to communities that are more distant or more generally to the entire country? A good example is watershed services. If the forest serves as a watershed, it provides benefits to downstream water users including farmers, ranchers, and villagers. The activities of these groups in turn contribute to national economic development. The forest ecosystem may also be a habitat for plants and birds that have a value in other parts of the country. Still other indirect benefits might include the cultural or spiritual values of the forest.

How do we motivate downstream users to share in the efforts to conserve the forest? Downstream benefits may be difficult to commercialise. The transaction costs of charging separate fees to each customer for each indirect service are probably prohibitive. Thus, the forest’s management authority might consider approaching the national or provincial government directly for a payment for the ecosystem services rendered downstream and thus to the broader society. Here valuation studies can be used to assist in quantifying the indirect benefits of the forest to provincial or national economies, and thus can be used to determine the appropriate level of payment for these services.

Finally, we also need to consider the global customers for the forest. Within the mandates of global environmental agreements, the forest clearly provides at least two global services: biodiversity conservation and carbon sequestration. Again, valuation studies, such as contingent valuation surveys to estimate the existence value of forests and other ecosystems, can be used to estimate the global benefits arising from conserving the forest. With the general absence of markets for such global benefits, such valuation techniques, as imprecise as they are, provide at least a rough estimate of the level of benefits generated.

The principles of the Convention on Biological Diversity are that conservation of a forest ecosystem will involve the sustainable use of its biological resources as well as equitable sharing of the benefits that arise from use of these resources. If the forest is to be conserved, however, there must also be sustainable financing of forest management, as well as the equitable sharing of the costs of conserving the forest.

Conservation generates both benefits and costs. If the costs are not addressed and sufficiently covered, the benefits will be lost. Costs can and should be recovered from those who use the forest, whether at local, provincial, national or global levels, and whether through local community, governmental or commercial channels. What measures can be put in place to ensure that people not only benefit from the sustainable use of forest goods and services, but that they in turn pay for the conservation of the forest itself?

It is, of course, not necessary to capture all the values or “economic surplus” generated by conserving the forest. The financial objective should be to capture sufficient revenues to ensure that the forest will be conserved over time. Through careful financial management of the forest ecosystem, both current and future generations can benefit from its conservation and sustainable provision of ecosystem goods and services. In this respect, economic valuation can be used a tool to ensure the financial sustainability of the forest.

What if a forest ecosystem does not have any customers? What if there is not direct or indirect demand for its ecosystem goods and services? What if the opportunity costs of conservation—i.e. the benefits which would accrue from replacing the forest with other land uses such as farming or mining—bring about strong pressures to clear the forest? In such cases, the forest’s management authority will have to focus its efforts on marketing forest conservation and the provision of ecosystem goods and services.

From the perspective of global environmental agreements, however, it is highly unlikely that the global customer base should ever be truly insufficient. The very existence of these agreements is evidence of a global demand for ecosystem conservation, including the forests and other ecosystems of western Africa.

Nevertheless, global customers may not be in a position to pay for the benefits they receive in a manner that will provide the appropriate incentives for the managers of the forest to conserve it. Thus, valuation studies can also be used as a marketing tool to help raise additional revenues and support internationally. In addition, valuation studies can be used as a policy tool to encourage institutional reform that will enable the forest management authority to generate sufficient revenues from its broad customer base to make this forest financially sustainable.

Economic valuation exercises in developing regions such as western Africa can also be linked to sustainable development initiatives. Today these initiatives tend to focus directly on poverty alleviation and more broadly on the attainment of the UN Millennium Development Goals (MDGs). The late David Pearce explains:

“The world’s poor depend critically on fertile soil, clean water and healthy ecosystems for their livelihoods and well-being. This reliance creates complex, dynamic interactions between environmental conditions, people’s access to and control over environmental resources, and poverty. Understanding the nature of these relationships is a prerequisite for enduring success in the fight against poverty. Yet, the central importance of environment for poverty reduction, and the economic case for pro-poor investment in environmental assets, remains dishearteningly unfamiliar to many.”

UNDP, 2005b

Economic valuation can play a role in the development of new schemes to manage ecosystems with the aim of tackling both human poverty and environmental conservation jointly. For these schemes to succeed, improved valuation tools are needed to better inform policy makers of synergies and trade-offs between development and environment priorities. This is especially true of ecologically fragile and poverty-stricken regions such as western Africa where conflicts between environment and development policy can have such devastating effects on people’s livelihoods.

2. Valuation and Decision Making

Practically speaking, valuation is a key first step in providing economic information and as such is a vital decision making tool. Identifying and quantifying the value of an environmental asset such as a forest ecosystem can be both an interesting intellectual exercise for an academic environmental economist and an important pragmatic exercise for an environmental policy economist.

The value of ecosystems can be split into three main categories:

- ecological values,
- economic values, and
- socio-cultural values.

Although this report focuses on economic values, it is important to appreciate the other value categories given the global context that many evaluation exercises are carried out in. Indicators for these categories are presented in Figure 1 below:

Figure 1: Values of ecosystem goods and services

Total value / importance		
↑	↑	↑
Ecological (based on ecological sustainability)	Economic (based on efficiency and cost-effectiveness)	Socio-cultural (based on equity and cultural perceptions)
Indicators: - naturalness - diversity - uniqueness - sensitivity -renewability	Indicators: - productive use - consumptive use - employment - income	Indicators: - therapeutic value - amenity value - cultural value - spiritual value - existence value

adapted from <http://topshare.wur.nl/naturevaluation/71609>

For the valuation exercise to be of real use to sustainable development decision-makers, a framework is needed to place the valuation in a broader context. A structured valuation process is essential to give purpose and direction to a particular valuation study. A good structure will also probably save time and money. Such a structure identifies what the valuation study will be used for, which values are important to quantify, and which valuation techniques are most practical. If a

valuation study is to be useful to decision makers it should include three initial steps:

- defining the users of the study;
- determining the scope of the study; and
- choosing the appropriate valuation techniques.

Before starting a valuation study, most importantly, the end users of the study should be clearly identified. Establishing the intended use of the valuation study gives the study a *raison d'être*, enables it to be carried out more efficiently and effectively, and helps to ensure that the valuation is relevant and clear to those who need the information.

As highlighted in the previous section, there are many different types of values which can be associated with many different ecosystem issues. For examples, decisions may need to be made about:

- designing and carrying out projects in or adjacent to protected areas;
- designing and carrying out projects which use natural resources or services;
- designing and carrying out projects upstream or downstream from conservation areas;
- devising and carrying out poverty reduction schemes for those most dependant upon resources;
- establishing and implementing rural development programmes relating to local environmental assets;
- establishing and implementing policies for ecosystem management;
- establishing and implementing policies for financing environmental protection;
- designing strategic environmental plans at local, national and international levels;
- designing economic incentives for environmentally-responsible use of resources;
- developing markets for ecosystem products;
- designing payments schemes for ecosystem services; and
- deciding on responsible investments.

Such decisions could be made by a variety of decision makers such as:

- protected area managers;
- local community leaders;

- elected government officials;
- economic development ministries;
- private companies and land owners;
- labour union representatives;
- multilateral and bilateral donor agencies; and
- environmental and development NGOs.

Clarity about the type of decisions which need to be made and the nature of the decision-making groups will help to determine which values need to be quantified and how those studies need to be conducted and how the results need to be expressed.

For instance, a decision about carrying out a construction project adjacent to a protected area requires information about a set of values different from those needed for a decision about how much global funding to seek in support of maintaining large marine ecosystem. Additionally, the people involved in the public enquiry of the construction project will probably need the valuation information presented in a manner different from a Ministry of Finance official or the World Bank employee.

The perspectives of the relevant decision-makers will also influence what is considered a benefit and what is a cost. One group's costs may be another group's benefits. In some cases it may be necessary for an ecosystem manager to represent what is a 'cost' to one group as a benefit to another group. For example, taxpayers may view civil service jobs as a cost while local communities and labour unions may view these jobs as a benefit.

In a recent World Bank paper, Stefano Pagiola, Konrad von Ritter and Joshua Bishop focused on four important uses of valuation studies all of which have direct relevance to West Africa. These are:

- **“Determining the value of the total flow of benefits from ecosystems.** This question typically arises in a ‘national accounts’ context: How much are ecosystems contributing to economic activity? It is most often asked at the national level, but can also be asked at the global, regional, or local level.
- **“Determining the net benefits of interventions that alter ecosystem conditions.** This question typically arises in a project or policy context: Would the benefits of a given conservation investment, regulation, or incentive justify its costs? It differs fundamentally

from the previous question in that it asks about *changes* in flows of costs and benefits, rather than the sum total value of flows.

- **“Examining how the costs and benefits of ecosystems are distributed.** Different stakeholder groups often perceive very different costs and benefits from ecosystems. Understanding the magnitude and mix of net benefits received by particular groups is important for two reasons. From a practical perspective, groups that stand to ‘lose’ from conservation may seek to undermine it. Understanding which groups are motivated to conserve or destroy an ecosystem, and why, can help to design more effective approaches to conservation. From an equity perspective, the impact of conservation on particular groups such as the poor, or indigenous peoples, is also often of significant concern in and of itself.
- **“Identifying potential financing sources for conservation.** Knowing that ecosystem services are valuable is of little use if it does not lead to real investments in conserving the natural ecosystems that provide them. Simply knowing that a protected area provides valuable watershed protection benefits, for example, does not pay the salaries of park rangers. Yet experience has shown that relying solely on government budget allocations or external donors for the necessary funding is risky. Valuation can help identify the main beneficiaries of conservation and the magnitude of the benefits they receive, and thus help design mechanisms to capture some of these benefits and make them available for conservation.”
World Bank, 2004a

This paper summarised these four approaches and how they are addressed by valuation studies as shown in Figure 2:

Figure 2: Approaches to valuation

Approach	Why do we do it?	How do we do it?
1 - Determining the total value of the current flow of benefits from an ecosystem	To understand the contribution that ecosystems make to society	Identify all mutually-compatible services provided; measure the quantity of each service provided; multiply by the value of each service

Approach	Why do we do it?	How do we do it?
2 - Determining the net benefits of an intervention that alters ecosystem conditions	To assess whether the intervention is economically worthwhile	Measure how the quantity of each service would <i>change</i> as a result of the intervention, as compared to their quantity without the intervention; multiply by the marginal value of each service
3 - Examining how the costs and benefits of an ecosystem (or an intervention) are distributed	To identify winners and losers, for equity and practical reasons	Identify relevant stakeholder groups; determine which specific services they use and the value of those services to that group (or changes in values resulting from an intervention)
4 - Identifying potential financing sources for conservation	To help make conservation financially sustainable	Identify groups that receive large benefit flows, from which funds could be extracted using various mechanisms

adapted from World Bank, 2004a

In short, for valuation studies to be of value themselves, it is critically important to identify what specific information is needed and by whom.

3. Valuation methodologies

This section of the report provides a non-technical introduction to the various type of environmental values economists study as well as to the various methods they use to assess these values.

3.1. Categories of value

Identifying an ecosystem's goods and services, determining who values those goods and services, and measuring these values is not always an easy and straightforward process. The goods and services may include tourism, hunting, timber, ground water repletion, water filtering, prevention of floods and soil slides, all types of "avoidance services" (loss of water, soil and air amount or quality, avoidance of fires) wild harvesting, wildlife habitat, watersheds, carbon sequestration, and access to genetic materials.

Some ecosystem goods and services may be traded in markets and thus have a market value, such as timber products and tourism services. Other goods and services may not be traded in open, commercial markets and therefore do not have a clear market value, such as illegally harvested wild species. Still other ecosystem goods and services are not

traded at all and do not have a market value, but nevertheless have direct and indirect benefits and costs associated with their provision.

The concept of total economic value is now a well-established and useful framework for identifying various environmental values. The total economic value of an environmental asset such as a forest ecosystem consists of both its use values and its non-use values. The ecosystem's use values in turn are made up of its direct use values, its indirect use values, and its option values. The ecosystems non-use values include its bequest values and its existence values. Figure 3 provides a classic overview of the various categories of value:

Figure 3: Categories of economic values

Total economic value				
Use values			Non-use values	
<i>Direct use values</i>	<i>Indirect use values</i>	<i>Option values</i>	<i>Bequest values</i>	<i>Existence values</i>
outputs directly consumable	functional benefits	future direct and indirect values	use and non-use value of environmental legacy	value from knowledge of continued existence
food, biomass, recreation, health	flood control, storm protection, nutrient cycles	biodiversity, conserved habitats	habitats, prevention of irreversible change	habitats, species, genetic, ecosystem

adapted from IUCN, 1994

These values can also be shown schematically as follows in Figure 4:

Figure 4: Total economic value

Total economic value = Use values + Non-use values
Where
Use values = Direct use values + Indirect use values + Option values
And
Non-use values = Existence values + Bequest values
and therefore
Total economic value = Direct use values + Indirect use values + Option values + Existence values + Bequest values

Use values include the value of direct and indirect uses plus the value of use options.

Direct use values are derived from direct use activities such as tourism, natural resource harvesting, and hunting. In some cases, these activities can be traded on a market and thus have a market value. In some case, such as collecting fuel wood and grazing livestock by local communities, the direct use may be not be traded in markets and so the values will need to be estimated.

Indirect use values are derived from indirect uses such as watershed protection, climatic stabilisation, carbon sequestration and other ecosystem services. Other indirect natural services include habitats for insects which pollinate local crops or for raptors which control rodent populations. Indirect use values are often widely dispersed and rarely traded in open markets.

Option values are derived from the option of using an environmental asset sometime in the future. These future uses may be either direct or indirect and may include the future value of environmental information. Future environmental information is often cited as particularly important for biodiversity as untested genes may provide future inputs into agricultural, pharmaceutical or cosmetic products.

Non-use values incorporate additional values to those, which arise from usage. Two common types are bequest values and existence values:

Bequest values are a type of non-use value that people have for an environmental asset. It refers to the value derived from knowing that others benefit from an environmental asset.

Existence values are particularly difficult to quantify as they stem from the idea that nature should be conserved 'in its own right'. Indeed, it can be argued, that there is value in simply knowing that an environmental asset, such as a tropical rainforest, exists even if one might be unlikely to visit it or use it in any way. At issue, is the question of whether individuals can assign intrinsic value to nature and its component parts.

With regard to existence values, a further distinction can be made between anthropocentric and non-anthropocentric values. The former include existence values that encompass intergenerational altruism – the provision for future generations or the idea that humans are stewards acting on behalf of all nature. The latter encompass the value of entities such as ecosystems whose values are not irreducible to that of the sum of their components.

Given the complex nature of the subject, it is easy to appreciate that the terminology of valuation studies tends to vary somewhat. However, economists generally attempt to categorise and then quantify use values and non-use values, especially those values that are not traded in open markets. A typical presentation on valuation categories – this one on protected areas – is presented in Figure 5:

Figure 5: Total economic values of protected areas

Use values			Non-use values	
<i>Direct use value</i>	<i>Indirect use value</i>	<i>Option Values</i>	<i>Bequest values</i>	<i>Existence values</i>
Recreation	ecosystem services	future information	use and non-use values for legacy	biodiversity
sustainable harvesting	climate stabilisation	future uses (direct and indirect)		ritual or spiritual values
wildlife harvesting	Flood control			culture, heritage
fuel-wood	ground-water recharge			community values
grazing	carbon sequestration			Landscape
agriculture	habitat			
gene harvesting	nutrient retention			
education	natural disaster prevention			
Research	watershed protection, natural services			

adapted from IUCN, 1998a

Whatever terminology is adapted in a particular valuation study, it is important that the terms and how they relate to each are defined precisely to ensure that the users understand what values are being assessed.

3.2. Valuation methods

Over the last two decades, environmental economists have developed a portfolio of sophisticated techniques for quantifying various types of values. Increasingly, there is a consensus emerging on state-of-the-art valuation methods. As recently noted within the deliberation of the Convention on Biological Diversity, there are increasing similarities among most of the recent handbooks and manuals on economic

valuation (CBD/SBSTTA/11/9, 2005). This section highlights some of the more common techniques and methods.

Market-based valuation quantifies the value of environmental goods and services traded in open commercial markets (UNEP, 2000). This is relatively straightforward because the markets have already done the work of eliciting values from environmental consumers. For example, the direct use values of environmental tourism could be measured through the direct sales to tourists that may include expenditures on lodging and meals, entrance fees, concessions, rentals, guides and so on. Another example is the emerging markets for ecosystem goods and services such as carbon sequestration or watershed protection.

Contingent valuation quantifies the value of an environmental good or service by asking people what they are willing to pay for it or willing to accept for its loss (IUCN, 1994). Though not without controversy, the concepts of “willingness to pay” and “willingness to accept” are used to estimate values where markets do not exist, such as existence values, option values, indirect use values and non-use values.

Hedonic pricing uses existing markets – such as the property or labour markets – to determine the value of an environmental good or service (IUCN, 1994). This approach quantifies the component of a property’s price or a worker’s wage wages attributable to the environmental good or service. Hedonic pricing can also be used to value environmental damages, and their effects on property prices or wages.

Travel costs also uses existing markets to determine the value of an environmental asset from estimating the costs incurred when travelling to the environmental asset in terms of time, travel expenditures and entry fees (IUCN, 1994). Travel cost methods are particularly useful for assessing the non-commercial tourism values of a protected area.

Changes in productivity can be used to estimate the change in the value of production of a good or service that occurs as a result of the change in land use (CBD, 2005a). For example, a protected forested area may be being considered for a clear-cutting operation. As it stands, the forest provides a watershed service to farmers downstream. The change in land use would result in a change in productivity of the farmers, which could be estimated as an indicator of the value of the forest’s watershed service.

Loss (or gain) of earnings evaluate the change in human productivity resulting from environmental deterioration or improvement (IUCN, 1998). For example, if water quality improvements reduce the levels of

disease resulting from poor water quality, then the gain of earnings can be used to estimate the value of clean water.

Opportunity costs provide an estimate of the value of a natural ecosystem based on the foregone income of the next best alternative use of the area (IUCN, 1994). Measuring the opportunity cost of the protected area, for example, can give the manager an idea of the competitive threats to the area. In the case of potential threats from people living adjacent to a protected area, the relevant opportunity costs will be the value of alternative land uses they may prefer, such as farming or ranching. Other interest in the area may come from pressures for industrial or urban development, mining or intensely modified recreation uses.

Replacement costs can be used to measure the cost of damage done to ecosystem by estimating the cost of replacing the damaged environmental assets (IUCN, 1994). If replacement costs exceed prevention costs, then the damage should be avoided. Somewhere, factors that introduce distortions in the value of resources should be dealt with.

4. Limits to and challenges of evaluation

Economic valuation studies, of course, cannot answer all the questions we have about conserving ecosystems, using their goods and services sustainably, and ensuring that such use contributes to sustainable development and poverty alleviation. Valuation techniques are most reliable when estimating direct and indirect uses of ecosystems. There are greater challenges to estimating non-market values such as option and existence values. Also, valuation techniques have not been developed to address long-term and large-scale ecological issues. Figure 6 highlights some shortcomings of valuation.

Figure 6: Common valuation pitfalls

Use net benefits, not gross benefits.	Failing to consider the costs involved in using resources results in an over-estimate of the value of ecosystem services.
Include opportunity costs.	The cost of an action is not limited to the out-of-pocket costs. It also includes the opportunity cost resulting from the foregone benefits of an alternative action.
Don't use replacement costs...	... unless you can demonstrate (i) that the replacement service is equivalent in quality and magnitude; (ii) that the replacement is the least cost way of replacing the service; and (iii) that people

	would actually be willing to pay the replacement cost.
Don't use benefits transfer...	... unless the context of the original valuation is extremely similar to the context you are interested in.
Don't use value estimates based on small changes in service availability to assess the consequences of large changes in service availability.	Economic value estimates are not independent of the scale of the analysis.
Be careful about double-counting.	Many valuation techniques measure the same thing in different ways.
Don't include global benefits when the analysis is from a national perspective.	More generally, only consider benefits (or costs) that affect the group from whose perspective the analysis is being undertaken.
Adjust for price distortions...	... when conducting the analysis from the perspective of society as a whole, but not when conducting the analysis from the perspective of an individual group.
Avoid spurious precision.	Most estimates are by necessity approximate. When there is substantial uncertainty, report the results as ranges.
Submit results to sanity checks.	Are the results consistent with other results? Are they reasonable in light of the context? Extraordinary results are not necessarily wrong, but must be checked carefully.

adapted from World Bank, 2004b

5. Use of valuation in western Africa

This section of the report reviews key findings and recommendations of valuation case studies from western Africa. Though far too few environment valuation studies have been undertaken in the region, those that have been done clearly demonstrate the usefulness of valuation studies to sustainable development.

5.1. Cameroon

Two studies from Cameroon are reviewed – one on wetlands and the other on forests.

Waza Logone floodplain, Cameroon: Economic benefits of wetland restoration

Lucy Emerton (IUCN, 2003)

- ***What are the problems and the issues at stake?***

The study describes an exercise undertaken to assess the economic effects of floodplain degradation in the Waza Logone region of Cameroon. The last 10-15 years have seen increasing numbers of dams and canals being built upstream of many of the country's flood plains. The ensuing degradation of these plains, which constitute about 60% of all freshwater resources, has had severe impacts on the floodplain ecologies and the populations of fisher folk and pastoralist populations who traditionally rely on the affected resources.

- ***How has the case study been useful in assessing values?***

The study takes into account the economic costs of flood loss and the potential benefits of re-inundation with a view to influencing the decision on investment in flood release measures. The study focused on the potential for additional value to the floodplain region and only counted benefits that were environmentally sustainable in the long run.

The study shows that the 30% reduction in floodplain area that originally contributed US\$10 million to the region, costs the local population more than US\$ 2 million. The study also highlighted the additional US\$ 800,000 a year that was generated by previous pilot flood release projects. The study explained that this would translate to "between US\$ 5.6 million and US\$ 7.8 million when investment and operation costs were taken into account" which, on a per capita basis, would equate to "\$50 added economic value per floodplain-dependent member of the population."

- ***How do the estimated values help to understand incentives, design responsive tools and promote desirable changes?***

The study presents clear economic justification for government and donor investment in flood release measures to restore the hydrology and biodiversity of the floodplain. The key findings and recommendations were as follows:

"The results of the valuation study both presented a convincing argument for investment in flood release measures in the Waza Logone floodplain as a mechanism for rural poverty alleviation and sustainable livelihood development, and also highlighted the high economic costs to poor rural populations of having failed to take

environmental values into account when the original investment in the SEMRY irrigation scheme was made.”

Feasibility study on financing mechanism for conservation and sustainable management of central African forests

Melissa Moye and Brigitte Carr-Dirick (WWF, 2002)

- ***What are the problems and the issues at stake?***

The study was prepared at the request of the ministers in charge of forests of central Africa (COMIFAC) who have expressed their commitment to prioritising the conservation and sustainable management of Central Africa’s forests. It analyses the opportunities and constraints of introducing new financial mechanisms including environmental trust funds, debt relief mechanisms, forestry-based carbon offset projects, user fees, charges and taxes, and private sector initiatives.

- ***How has the case study been useful in assessing values?***

The study applies strategic reasoning in its approach to each potential mechanism. It argues, for instance, for a focus on initiatives that are “linked to the creation and/or implementation of trust funds dedicated to financing specific sites or zones,” one of the reasons being that this “increases the potential for mobilizing contributions from bilateral donors based on their specific priorities.”

This practical and focused approach makes it easier to build consensus, reinforce capacities and sensitise diverse actors. The study also emphasises the importance of the governments of the sub-region meeting certain criteria that include: showing their commitment to the Yaoundé Declaration; consecrating the necessary budgetary resources; improving their good governance “brand image”; and creating institutional settings that are favourable to private sector investment.

- ***How do the estimated values help to understand incentives, design responsive tools and promote desirable changes?***

There is no single, correct, financial mechanism, such as a sub-regional trust fund, that will solve the region’s problems. Rather, “sustainable financing for Central African forests will require the combined implementation of an ensemble of financing mechanisms”. To do this, knowledge about financing mechanisms needs to be reinforced, as does the appreciation for the various existing mechanisms.

5.2. Nigeria

One study from Nigeria on wetlands is reviewed.

The economic importance of wild resources in the Hadejia-Nguru wetlands in Nigeria

Derek Eaton and Marie-Thérèse Sarch (IIED, 1997)

- ***What are the problems and the issues at stake?***

This study presents the results of a training workshop and field study undertaken to assess the economic importance of the major wild resources harvested within the Hadejia-Nguru wetlands using participatory appraisal techniques. Although most of the major sub-systems of the Hadejia-Jama'are floodplain, including irrigated farming, flood and rain-fed agriculture, fisheries and livestock have been valued, there is still little information on the economic role of other wild resources harvested from the floodplain.

Wild resources tend to be hidden under the guise of subsistence production and as such are omitted from conventional production statistics. Without a truer understanding of these values decisions on development priorities risk being misguided or inappropriate.

- ***How has the case study been useful in assessing values?***

The project aimed to build the capacity of local organisations to carry out resource evaluation exercises to provide new development planning information in the form of financial values, economic values and returns to labour, as well as extensive qualitative information on resource use. The resulting information is not intended to answer all questions regarding the economic importance of wild resources and should instead be used to “establish orders of magnitude for the actual values and indicate which areas deserve further research.”

The study highlights important difficulties in estimating the economic values of wild resources. *Inter alia*, these include the unquantifiable values of the resources due to the fact they are gathered and not bought; the varying opportunity costs of labour; and the seasonal nature of production activities that makes values dependent on the time of year they are acquired and by whom.

- ***How do the estimated values help to understand incentives, design responsive tools and promote desirable changes?***

The key findings and recommendations focus on the applicability of valuation studies in the region:

“The study confirmed that participatory research techniques can be used to investigate both relative and absolute economic values, although, there are limitations to the use of collecting absolute quantities for aggregation and scaling up over a wide area. Nonetheless, increased understanding of the economic importance of wild resources provides useful and timely information with which the HNWCP will be able to reinforce its important policy recommendations on the necessity of maintaining regular flooding of the Wetlands.”

5.3. Senegal

The Senegalese valuation studies focus on wild resources and protected areas.

Theorizing access: Forest profits along Senegal's charcoal commodity chain

Jess Ribot (Harvard University, 1997)

- ***What are the problems and the issues at stake?***

There is much profit to be made through commercial forestry. This article examines how benefits from Senegal's charcoal trade are distributed and affected by factors such as access to the forest, markets and capital, which are in turn based on inter-related mechanisms that include, legal property, social identity, social relations and information control.

Virtually all of Senegal's domestic energy needs are met by firewood and charcoal with rural households consuming the former and urban households tending to use the latter. A commodity chain exists that consists of cutting and carbonizing wood in Senegal's forests, and then transporting it to urban centres for distribution and use. The energy loss incurred in producing charcoal means that “the urban 30 per cent of Senegal's population of 7 million consumes over half of the total wood fuels produced nationally”. The article shows that a “careful analysis of price margins, expenses, and quantities handled by different actors in the charcoal filière” reveals a “highly skewed picture of the distribution of the benefits from commercial forestry.

- ***How has the case study been useful in assessing values?***

The article's method facilitates the study of the benefits and the supporting mechanisms involved in such natural resource use and distribution. Access mapping through commodity chain analysis is shown to be “an effective approach to tracing out the social and political-

economic hierarchies and networks in which extraction, production and exchange are embedded.” It is used to evaluate the distribution of profits derived from charcoal as it passes through the commodity chain from extraction to final use. In this way, light is shed on “the limited role of property, the embedded nature of markets, and the role of extra-legal structures and mechanisms in shaping equity and efficiency in resource use”. Access mapping also “illuminates the practical issues surrounding establishment of community participation in benefits from and control over natural resources.” In short, access mapping provides a means to explore the non-policy mechanisms that shape the market.

- ***How do the estimated values help to understand incentives, design responsive tools and promote desirable changes?***

The article argues that although forest policy helps shape forest use, production practices and wood fuel trade, it alone cannot be held accountable for skewed distribution. Even liberalisation would only have limited redistributive effects on benefits as legal and extra-legal strategies used by merchants and wholesalers would always impede the establishment of the ‘free market’ of neoclassical theory. In this regard, the case study highlights the importance of selective access in widening the gap between idealized legal formulations and actual practice. It argues clearly that “there is not just one ‘market mechanism’, rather there is a whole array of mechanisms integral to production and trade.” In this way, “both the formal and informal market-state relations shape the implementation and ultimate effects of policy.”

When identifying who benefits from forests and how, commodity chain analysis is, at its most applied level, a policy tool. In exposing the weakness of policies that prescribe local property rights in forests, it clearly demonstrates its use in evaluating how policies might reshape distribution patterns.

The economic value of wild resources in Senegal

Cheikh Oumar Ba, Joshua Bishop, Moustapha Deme, Hamet Diaw Diadiou, Alioune B. Dieng, Oumar Diop, Pedro Andres Garzon, Moustapha Kebe, Oumou K. LY, Vaque Ndiaye, Cheikh Mbacké Ndione, Astou Sene, Djiby Thiam, and Ibrahima A. Wade (IUCN, 2003)

- ***What are the problems and the issues at stake?***

Although widely appreciated, there is little reliable and up-to-date information on the economic importance of wild resources to human welfare. This draft report presents a summary of findings of recent research on the value of non-timber forest products, game, and freshwater fisheries in Senegal, West Africa. The research is based on

new data gathered from producers, traders, and consumers of wild plant and animal products.

- ***How has the case study been useful in assessing values?***

The study provides “significant new information on the production, trade and consumption of non-timber forest products, game and freshwater fisheries.” It makes valuable contributions to a major new dataset that “is beginning to provide important insights into the economic importance of wild resources.”

The benefits to primary producers come mainly in the form of labour payments. This constitutes half of the total economic value added in the production and distribution of non-timber forest products (NTFPs). The study suggests “full accounting of the harvest of NTFPs in two major producing regions in Senegal would add at least FCFA 1.4 billion per annum (US\$ 2 million) to national income.” If primary producers receive around 50 per cent of the final market value of wild products then the annual value added in the entire supply chain can be estimated at “between FCFA 1.6 and 3.1 billion (US\$ 2.3 to 4.3 million)”.

If this data is used to extrapolate for the rest of the country, then an estimated annual value added would range from “FCFA 3.5 to 11.1 billion, with a median estimate of about 4.5 billion (US\$ 6.3 million).” This is considerable given that it is “equivalent to about 14% of the recorded value added in the forest sector in the year 2000, which excludes most NTFPs.”

- ***How do the estimated values help to understand incentives, design responsive tools and promote desirable changes?***

The economic value of wood fuel, charcoal, building materials, illegal hunting, sport hunting, wildlife-based tourism, live animal exports, and freshwater fisheries can be conservatively estimated to be between US\$ 19 and 35 per annum. Additional research could be carried out on the economic effect of medicinal plant use. Clearly, the economic significance of wild resources in Senegal is considerable.

If the government is to successfully pursue long-term poverty reduction strategies it is “essential that the full economic contribution of wild resources is taken into account”. Further, the report finds that wild products are more important for poor households, making wild resource use and management “central to poverty alleviation not only in rural areas but among deprived urban populations also”. Finally, the report recommends “further dissemination and analysis of the data can help guide policy reforms and investment proposals, for more productive and

sustainable use of wild resources in Senegal and other countries of the region.”

Summary of the Djoudj and Diawling valuation studies

Oumou Koulsoum Ly et al (IUCN, 2003)

This document is a summary in French of the results of the valuation studies of the Djoudj and Diawling National Parks. Beyond their impact on fauna and the flora, the restoration, installation and management projects of these national parks improved visibly the social conditions of the local populations and strongly favoured the development of many economic activities in the delta of the Senegal River.

The draft report of the valuation study of Djoudj National Park

Oumou Koulsoum Ly et al (IUCN, 2003)

The key results and recommendations of this draft study in French are (a) to consider all the "political" implications emanating from the results, (b) make clear recommendations on the options of development of tourism and (c) work out arguments of negotiation in favour of the conservation.

The draft report of the valuation study of Diawling National Park

Oumou Koulsoum Ly et al (IUCN, 2003)

The key results and recommendations of this draft study in French include the observation that (a) the resumption of the activities of fishing, craft industry, gathering and (b) the improvement of the profitability of the truck farming and breeding are due mainly to the restoration of the flooding system, which determines the ecological balance of the zone.

6. Use of valuation elsewhere in Africa

This section of the report surveys selected valuation case studies from elsewhere in Africa of particular relevance to Western Africa. These include some studies which look at the value of environmental goods and services. Much of the research and indeed the expertise available in other parts of Africa could be of interest to environment decision-makers and managers in Western Africa.

6.1. Eastern Africa

IUCN, 1996

The opportunity costs of protected areas in Uganda

Peter Howard (IUCN, 1996)

- ***What are the problems and the issues at stake?***

Most of the natural reserves that take up 16 per cent of Uganda's land area were established under the British Protectorate when the population was only 20 per cent of what it is today. Now, as the population of Uganda rises above 17 million, there is ever increasing pressure to release this protected land that now has to "compete" with alternate uses. If appropriate management strategies are to be developed, it is therefore crucial to understand the economics of alternate land uses.

This study assesses in financial terms the opportunity cost of excluding human settlement, cultivation and pastoral activities from Uganda's National Parks, Game Reserves and Forest Reserves.

- ***How has the case study been useful in assessing values?***

The article's method is to use the "expected net returns from conversion to land-use patterns characteristic of similar adjacent areas." to express the opportunity costs of Uganda's protected areas.

- ***How do the estimated values help to understand incentives, design responsive tools and promote desirable changes?***

The method used then expresses "the opportunity costs of Uganda's protected areas in terms of expected net returns from conversion to land-use patterns characteristic of similar adjacent areas." The results suggest that "the total opportunity cost of Uganda's protected areas, calculated in this way, exceeds gross revenues under present management (approximately \$1 million in 1993/94) by 100 times, and the much larger benefits associated with community-use of products from protected areas (valued at approximately \$33 million annually) by about three times."

The implications for biodiversity conservation are that if preservation is going to be worthwhile in economic terms, it is necessary to use incentive measures. The key recommendation is that:

"this analysis has important policy implications, since it highlights the potential long-term value of protected areas under alternative

use, and the need to enhance their economic value in order to ameliorate inevitable future conflicts over land-use.”

Biodiversity and nature-based tourism: The potential for sustainable development in Uganda

Robin Naidoo and Wiktor L. Adamowicz (University of Alberta, 2005)

This working paper is a more detailed academic staff paper of the study described below.

WWF, 2005

Economic benefits of biodiversity exceed the costs of conservation at an African rainforest reserve

Robin Nairoo and Wiktor Adamowicz (WWF, 2005)

- ***What are the problems and the issues at stake?***

The decline of global biodiversity has solicited many responses. This paper reports on a study carried out by interdisciplinary teams of economists and ecologists to quantify the costs and benefits of avian biodiversity at a rainforest reserve in Uganda. This approach aims to establish the economically optimum level of conservation. It would be especially useful for tropical areas where species diversity is high and so is the reliance of impoverished human populations on their natural environment.

This study was undertaken in the Mabira Forest Reserve, which is composed of 300 Km² of tropical lowland forest that is surrounded by agricultural lands. The pressure on the forest is therefore intense, with harvesting timber, making charcoal and the need for land all competing with conservation as land-use possibilities. Benefits from an ecotourism centre, established in 1996, are distributed in an arbitrary fashion to local residents with the aim of increasing awareness of the forest's economic potential as well as compensating them for loss of its direct use. The study set out with the goal of “conserving the maximum number of forest bird species, subject to the constraint that the opportunity costs of conservation cannot exceed the benefits from tourism.”

- ***How has the case study been useful in assessing values?***

The results of the study go against the conventional wisdom that “biodiversity conservation is a non-competitive form of land use and, therefore, requires subsidising.” It finds that there is a “tangible economic demand of tourists for increasing levels of biodiversity” and that there is “strong evidence that consumers may actually prefer higher

numbers of species to lower numbers and, more critically, be willing to pay for it.” The study also concludes that given the present levels of agricultural rents, market-based conservation initiatives would result in almost all species’ habitats being converted to agricultural land.

- ***How do the estimated values help to understand incentives, design responsive tools and promote desirable changes?***

The study dismisses the idea of reforesting agricultural land as economically infeasible. Instead, it suggested “the economic benefits derived from avian biodiversity could protect 80–90% of a tropical forest reserve’s bird species.” The results have “important implications for ecotourism and protected areas because areas rich in biodiversity may be able to charge more for visitation rights than less diverse areas and, hence, may provide a mechanism for funding conservation of highly species ecosystems.”

The study also evaluated the willingness to pay for a given numbers of bird species likely to be seen and found that entrance fees were severely underestimating the value that foreign tourists would pay. The results suggest that increased fees coupled with education schemes and more organised distribution of benefits would optimise both biodiversity conservation and economic benefit in the long term.

6.2. Southern Africa

Private supply of protected land in Southern Africa: A review of markets, approaches, barriers and issues

Wolf Krug (CESERGE, 2001)

- ***What are the problems and the issues at stake?***

Increasing land use conflicts and insufficient conservation funds are making it harder to maintain the world’s biodiversity, much of which is found in developing countries. Ecosystem transformation and fragmentation, due to rapidly growing human populations and environmentally destructive practices, has reached an alarming scale. This is due in part because land conversion pays off for private farmers.

Although the strategy of setting aside protected areas had proved to be relatively successful in development countries, governments in poorer countries simply do not have the means to maintain such parks. Even if they did, the land covered by public parks is not extensive enough to protect biodiversity in the long run.

New and innovative approaches are now looking beyond the public sector to the private sector in order to create additional conservation

areas that might be funded through the development of markets for wildlife products and nature tourism.

- ***How has the case study been useful in assessing values?***

Through the comparison of public and private land, the study shows that the total area of privately owned land is increasing while expansion of the network of public protected areas is problematic. The budgets of state-managed parks are under increasing pressure, while private management is proving more effective at attaining financial self-sufficiency. This is because they harness the economic value of biodiversity and as a consequence make conservation a competitive form of land use.

The study lends force to the idea that “secure property rights to land and wildlife are an essential ingredient in any strategy to conserve and encourage long-term investment in wildlife habitat”.

- ***How do the estimated values help to understand incentives, design responsive tools and promote desirable changes?***

The study argues that:

“Markets for biological resources are responsible for the private supply of wildlife habitat, and that any policy impairing the relative competitiveness of wildlife as a land use will have a direct impact on the private supply of biodiversity.”

Other key results and recommendations of this most informative study are as follows:

“Although only limited information exists on private conservation initiatives, it is possible to conclude that the private sector plays an indispensable role in the provision of biodiversity in the region... Private reserves, conservancies and game ranches protect critical habitat in various regions and play an important role in the protection of highly endangered species... Consumptive and non-consumptive wildlife utilisation has proved to be economically competitive and environmentally sound forms of land use... Beside the economic benefits accruing to landowners, private reserves and game ranches provide the public good ‘biodiversity’ at zero cost to the taxpayer... It is important to recognise that markets for biological resources are responsible for the private supply of wildlife habitat, and that any policy impairing the relative competitiveness of wildlife as a land use will have a direct impact on the private supply of biodiversity.”

Introducing lion into Pilanesberg: An economic assessment

Deborah Vorhies and Frank Vorhies (EcoPlus, 1993)

- ***What are the problems and the issues at stake?***

This study focuses on the economic impacts of introducing lion into the Bophuthatswana National Parks (Bop Parks). The basic premise is that the introduction would help Bop Parks to accomplish its mission of contributing to the “upliftment of the quality of life in Bophuthatswana through the conserving of wild plants, animals and landscapes for the benefit of the people.” The report quantifies the expected benefits and the expected costs from their introduction in order to evaluate the best course of action.

- ***How has the case study been useful in assessing values?***

The study covers the following areas: the demand for lion; the supply of lion; the Pilanesberg Visitors; the Pilanesberg camps, photo safaris and hunting safaris; the region’s leisure resorts; and capital and operating costs. Three scenarios are provided: the very worst, the most likely and the very best and finds that the regional profits will be somewhere between R16 million to R36 million using 1993 values:

“Bop Parks stands to lose roughly R1 million per year in 1993 rands from the introduction of lion. The region including Bop Parks, on the other hand, stands to gain roughly R26 million per year. Thus the introduction of lion into Pilanesberg makes good economic sense.”

In addition to the economic assessment, the study also evaluates dimensions such as job creation, small business development and foreign exchange earnings for the region.

- ***How do the estimated values help to understand incentives, design responsive tools and promote desirable changes?***

The key results and recommendations were:

“There is however an income distribution problem. Under current arrangements, the lion's share of the profits will go to Sun Bop while Bop Parks must cover all the costs. We suggest that some form of joint venture relationship be set up including at least Bop Parks, Sun Bop and Stocks Leisure to finance and manage the lion introduction programme. This joint venture relationship should ensure that all parties share in a mutually acceptable manner the costs and revenues associated with the introduction of lion.”

Economic valuation of communal rangelands in Botswana: A case study
Jaap Arntzen (IIED, 1998)

- ***What are the problems and the issues at stake?***

This paper undertakes a valuation exercise in an effort to address causes of under-valuation. The objective is to estimate the annual direct use value of an average hectare of communal rangeland in Botswana, based on an analysis of secondary data. The little literature that does exist on rangelands tends to undervalue them because it is:

- “restricted to a specific sector, most commonly livestock production;
- biased towards one marketed product, frequently beef sales or slaughter; and
- limited to use values”

These issues are then manifest in the mismanagement of conversion of rangelands to monoculture and misguided policies and prescriptions. This article seeks to highlight the sum of direct use values that incorporates both marketed and non-marketed use of livestock, wildlife and gathering. The conclusions raise important policy questions regarding the future use of Botswana’s rangelands.

- ***How has the case study been useful in assessing values?***

The study reveals a “considerable hidden harvest” from rangelands with milk production and gathering emerging as priority areas. There is an important trade-off between wildlife and livestock; an increase in the latter may have lead to “a drop in total use value of land.” The study also draws attention to the need to explore the implications of a change in species composition with regards use options. Additionally, resource charges and fees were found to be inconsistent, confusing and in need of a systematic approach that balances equity, efficiency and sustainability but is still based on the principle of the “user-pays.”

- ***How do the estimated values help to understand incentives, design responsive tools and promote desirable changes?***

The study recommends that policies take into account rangeland’s multiple values. If total land productivity is to be increased attention must be drawn to the substantial productivity loses incurred through rangeland degradation. Without an assessment of the comparative advantages of these and other uses throughout the country the substantial livestock subsidies cannot reasonably be justified.

Finally, the study pinpoints other area of research in order to inform policy better. This includes the need for more accurate and more comprehensive production cost data for the three use areas in question. More research is also needed to better evaluate their external costs and compatibility at various levels of use intensity.

7. Uses of valuation out of Africa

There are, of course, many hundreds of valuation studies from other parts of the world, including other parts of the developing world. Three typical examples from non-African developing countries follow:

Economic valuation of biodiversity in Oman

Rasool Al-Jabiri (IUCN, 2001)

This study highlights the economics value of biodiversity in Oman through a simple quantitative model.

Economic valuation of forests in Himachal Pradesh

Madhu Verma (Indian Institute of Forest Management, 2000)

This study generates economic values for various goods and services provided by the forests.

Economic valuation of Bhoj wetland for sustainable use

Madhu Verma, Nishita Bakshi and Ramesh P.K. Nair (Indian Institute of Forest Management, 2001)

This study captures the values of the wetlands in the perspectives of the various stakeholders.

In addition, below are some links to key websites with papers from around the world on economic valuation:

Biodiversity Economics

<http://www.biodiversityeconomics.org/>

This site was recently re-launched under joint management of IUCN and WWF. It contains a wealth of information on valuation and the related topics of incentive measures and finance.

The Environmental Valuation Reference Inventory

<http://www.evri.ec.gc.ca/>

EVRI is a searchable storehouse of empirical studies on the economic value of environmental benefits and human health effects. It has been

developed as a tool to help policy analysts use the benefits transfer approach. (A subscription is required.)

Centre for Social and Economic Research on the Global Environment

<http://www.uea.ac.uk/env/cserge/>

CSERGE is a leading interdisciplinary research centre in the field of environmental and sustainable development, linking natural and social science theories, tools and methods.

Ecosystem valuation

<http://www.ecosystemvaluation.org/>

This site describes how economists value the beneficial ways that ecosystems affect people. It is designed for non-economists who need answers to questions about the benefits of ecosystem conservation.

Nature Valuation and Financing Network

<http://topshare.wur.nl/naturevaluation>

The overall aim of this Network is to stimulate the development of practical tools for proper valuation of the goods and services provided by ecosystems and biodiversity, so that decisions about economic development are made with the full understanding of all the costs and benefits involved.

8. Building capacities for valuation in western Africa

As this report demonstrates, valuation can be a useful tool for sustainable development. Thus, it is unfortunate that so little valuation work has been undertaken in western Africa. The work that has been done has also often been done by experts from outside the region.

There are several reasons for the lack of valuation work in the region including a lack of local expertise, the high cost of undertaking such research, the lack of interest by decision-makers in valuation research, and the lack of means to engage regional decision-makers on the potential role of valuation research. In short, there is a clear need for building capacities for valuation in western Africa.

The topic of capacity building for valuation was on the agenda of the recent 11th SBSTTA meeting of the Convention on Biological Diversity. This section builds on the official background documents for this meeting and the recommendations coming out of the meeting.

According to the Earth Negotiations Bulletin report of the meeting

“SBSTTA recommends that COP-8: consider the establishment of a process of systematic analysis and information exchange among CBD parties; encourage organizations and initiatives to extend capacity building and training on biodiversity valuation; invite institutions that support web-based information systems and databases on valuation to fully include cases on biodiversity valuation; and invite funding institutions to identify gaps and needs to support building or enhancing national capacity. COP-8 is recommended to request the Executive Secretary to: continue the compilation of information on methods for biodiversity valuation; and explore with relevant organizations options for cooperative activities, as well as options for innovative tools for biodiversity assessment and valuation.”

www.iisd.ca/biodiv/sbstta11/

8.1. Institution building

With respect to institution building, an official CBD document for SBSTTA11 stated:

“Adequate institutional arrangements can generally be identified as an important precondition to the further promotion of valuation as a tool in biodiversity management and the generation of reliable valuation studies. These arrangements should inter alia provide a clear assignment of responsibilities for conducting appraisal processes and auditing for quality control.”

CBD, 2005a

The document highlights some key areas for institutional development including:

- biodiversity values and national income accounts;
- development of national guidelines;
- involvement of stakeholders as well as indigenous and local communities;
- awareness raising; and
- pilot projects.

All of these are of critical importance to developing institutions for environmental valuation in western Africa. In addition, local expertise, funding, and political will are particularly relevant in the region. Given the limited number of studies, pilot projects may be most useful at this stage. As the document explains:

“Undertaking valuation studies as pilot projects on key domestic ecosystems can be another effective means to raise awareness of the value of biodiversity resources and functions and associated ecosystem services, and to advance the application of biodiversity valuation in domestic decision-making procedures.”

8.2. Training

Training is a particularly urgent need in western Africa. The background document for SBSTTA 11 referred to above states:

“The effective application of tools for the valuation of biodiversity resources and functions and associated ecosystem services requires considerable capacity and technical expertise. In many countries, capacity needs to be enhanced for putting adequate institutions in place, for conducting effective appraisal processes including the valuation of biodiversity and associated ecosystem services, for improved oversight and auditing for quality control, as well as for putting valuation results to good use in governmental decision-making by an effective and credible follow-up.”

The document also highlights some key areas for capacity building including:

- regional workshops;
- regional and international cooperation and training; and
- international databases for benefits transfer.

With respect to cooperation and training, the western Africa region could benefit specifically from recommendations for the following:

- regional training centres;
- academic exchange programmes;
- short-term courses offered by international organisations;
- arrangements between agencies for temporary secondment; and
- CD-Rom based resources and training manuals.

8.3. Research

Finally, with regard to research, the above-mentioned background document notes that:

“important opportunities for further research and development remain. Research initiatives that address these opportunities and

seek to establish regional or international cooperation and exchange should be supported.”

For a region such as western Africa, it is particularly important that conservation and development areas ensure that there is full participation in new research initiatives in priority areas such as:

- biodiversity valuation and national accounting;
- valuation tools;
- benefits transfer;
- linkages between biodiversity, biodiversity functions, and associated ecosystem services; and
- poverty and environment linkages.

Furthermore, as work on research and pilot projects for environmental goods and services develop, western Africa would benefit from inclusion in these efforts.

9. Linkages to the GEO-4 report

This section highlights relevant linkages to the UNEP’s upcoming GEO-4 report including issues selected by policymakers for inclusion in the report.

9.1. Linkages to the comprehensive annotated chapter outline

Please note that the *GEO-4 comprehensive chapter outline* should be available at:

<http://dewa03.unep.org/geo/tiki-index.php>

A copy is also available upon request. The page numbers referred to below are page numbers in the outline document.

Page 2

Key chapters for the topic of economic valuation are Chapter 5 on Biodiversity, Chapter 6 on Regional Perspectives (particularly the section on Africa), and Chapter 7 on Interlinkages. Also of importance are Chapter 2 on Atmosphere, Chapter 3 on Land, and Chapter 4 on Water. Valuation studies may be relevant to the various topics covered in these chapters.

Page 5

Regarding **Chapter 2 on Atmosphere**, the main topics are: air pollution, climate change, and ozone depletion.

Page 9

Regarding **Chapter 3 on Land**, the main topics are: rapid land use change, forests and woodlands, desertification, erosion, nutrient depletion, water scarcity and water quality, salinity, contamination and pollution, and perturbations of biologically mediated cycles.

Page 12

Regarding **Chapter 4 on Water**, the main topics are inland waters, coastal areas, and marine areas. These are also to be reported on in the context of human-wellbeing and development factors: human health, water availability, food security, human safety and security, and socioeconomic development and livelihoods.

Regarding these factors, the outline emphasises:

“Resource economics – pricing of ecosystem services; valuation methodologies (monetary and non-monetary)”

Regarding responses and interventions, the outline emphasises:

“Financing mechanisms and incentives
Incentives, deterrents, pricing and markets, Corruption,
Private sector, Certification”

Page 17

Chapter 5 on Biodiversity is the most relevant chapter for environmental valuation in Western Africa. It contains a key quote from the outline:

“Our challenge is getting the values right – cultural, economic, and social – so that the biodiversity of today is available for the generations of the future. ... The issues of providing greater value are not simple and will take research, imagination, and good will to sort through.”

Also, the global overview section of the chapter will:

“Introduce the links between biodiversity and the provision of ecosystem services. Highlight a number of ecosystem services that play a role in sustainable development (e.g. medicinal species, fisheries, forest products, bushmeat) and present trends in these services. Key issues – loss of biodiversity, current use of

biodiversity (agriculture, health, water purification, cultural...), and potential uses of biodiversity (bioprospecting in marine and terrestrial areas)."

Valuation plays a key role as well in the section on the drivers of change in biodiversity:

"Overview of indirect drivers (focus on population, consumption), can we add undervaluation?"

"Using the example of economic growth as an indirect driver, this chain will be explored to show both negative and positive effects on biodiversity. Value of biodiversity (internalisation of, natural capital). Patterns of growth and consumption. Examples will be given such as a case study of deforestation in Cameroon: economic growth in industrial countries leading to depletion of local forest and fisheries reserves, elevated price of hardwood, and finally demand for hardwoods in Cameroon. Also success stories - economic growth leading to investment in protected area systems and substitutes for biological products which has led to reduced exploitation."

Regarding Chapter 5 on Biodiversity, the main topics/themes are biodiversity and health, agriculture, materials and energy, security, and cultural values.

Regarding health, one of the responses in the outline is to:

"Examine undervaluation of current and potential uses of biodiversity for human and environmental health."

Regarding agriculture, responses in the outline include:

"Opportunities for sales and entrepreneurship using local biodiversity – pathway to prosperity"

Regarding materials and energy, the outline needs "to be elaborated."

Regarding (livelihood) security, the outline emphasises the impacts from natural disasters such as:

"Consequences for human well-being: number of casualties, economic losses, social and cultural impacts."

Regarding cultural values, the outline has a section on historical analysis of “rural people”:

“Directly receiving their goods and services from the immediate *environment*. Cultural beliefs, values, knowledge support perception of dependence on nature for human well-being, need for caring and stewardship, non-material valuation of resources and restraint in their use. Changes due to shift toward dominant culture begin to break down transmission of traditional beliefs, values, and knowledge, leading to more material, consumptive, wasteful behaviours. Degradation of environment in turn negatively affects their well-being.”

This section also looks at “poverty as a driver”:

“Rural using biodiversity beyond carrying capacity, and needs to feed urban poor leading to keeping prices low.”

Under Part III of this chapter on Synthesis will include “a focus on ... improving the valuation of biodiversity.”

Regarding policy development and implementation, the outline emphasises:

“Valuation of goods and services and recent attempts to reduce perverse incentives (subsidies and infrastructure impacts) and create markets or payment programs to increase incentives for conservation and protection of biodiversity and ecosystems.”

And it also highlights next steps:

- “Evaluation of valuation programs and further development
- Green accounting (national), triple bottom line (corporate)
- Research on sustainable use and compliance mechanisms”

Page 27

Regarding **Chapter 6 on Regional Perspectives**, the section on Africa focus on land degradation:

“The chapter will underscore the Land degradation issue, and the initiatives in combating it.”

The outline further states:

“The following will particularly be illustrated:

- adding value to the land resource that is not degraded;
- using land resources efficiently (and sustainably) to derive maximum benefit;
- making a case for safeguarding and improving the under-graded land asset”

Page 54

Regarding **Chapter 7 on Interlinkages**, insights from this report on environmental valuation should be able to provide input:

“This Chapter will address the question of whether policy coherence based on the analysis of interlinkages can provide multiple benefits to society and environment with minimum additional cost and deal with reality on the ground.

“Benefits to environment and for development can be realised by adopting an appropriate mix of policy responses and practices (technology, societal and behavioural, economic...) that explicitly recognize the linkages that exist within and amongst environmental change.

“What are the most efficient responses? Legal mechanisms (issue of enforcement/compliance)? Change in values and mindset (challenge to get people to think differently and in an integrated way)? Market-lead responses? Education (no one-fits-all solution - need for education at all levels - community, policy-makers)? Institutional integration?”

Valuation may be particularly important for identifying “benefits of considering interlinkages” including:

“Cost-effective to deal with multidimensional impacts

“Marginal cost of adopting an interlinkages approach is minimal when compared to the opportunity cost and benefits, especially at the national level...

“Potential for enhanced cooperation and collaboration for projects, investment and financing, as well as enhanced international environmental governance (ex: coherence between policies and activities of UN agencies – coordination between scientific and

technical activities, harmonization of national reporting, joint capacity building activities...).”

Of relevance to the Western Africa context, the chapter highlights linkages among: “Climate change-Land Degradation-Biodiversity”.

Page 62

Regarding **Chapter 8 on Challenges and Opportunities**, environmental valuation may be able to provide insights for the vulnerability framework used to address opportunities:

“In the overall context of GEO-4, this chapter seeks to find opportunities for improving human well-being by mainstreaming the environment into six important policy domains (cross-cutting issues): poverty; human health; institutions and governance; trade; science and technology, and conflict and cooperation.

“A vulnerability framework is used to look at the relevance of these six cross-cutting issues to human well-being. Vulnerability is very context and place specific. Therefore we include place-based integrated assessments of the interactions between environmental change, the impact of the changes on human well-being and the loss of ecosystem services.”

The chapter also highlights key “domains for policy-making” which are similar but not entirely the same as the themes in the biodiversity chapter: poverty, human health, science and technology, trade, conflict and cooperation, and institutions and governance.

Page 66

Regarding **Chapter 9 on The Future Today**, valuation studies might provide inputs into the scenarios which will be presented.

Page 68

Regarding **Chapter 10 on Policy Options**, the list of “emerging policy options” has direct relevance to valuation:

- “Informational regulation (e.g. PROPER system in Indonesia)
- Economic instruments (e.g. Carbon taxes)
- Voluntary agreements (e.g. Netherlands Environmental Policy, clean production mechanism)
- Civil society initiatives
- Eco-labelling (e.g. Blue Angel, certification schemes for forests, fisheries etc.)

- Private-public partnerships (e.g. Equator principles)
- Local Agenda 21
- Corporate environmental and social responsibility (e.g. Global Reporting Initiative)
- Eco-currencies (e.g. Japan)
- Carbon trading (e.g. WB carbon prototype fund, CDCF)
- Developing markets for environmental services and goods (e.g. California wetland swaps, Panama national protected areas system)
- Debt for nature swaps
- Transboundary parks and protected areas (e.g. Mesoamerican Biological Corridor)
- Joint implementation and cleaner development mechanism
- Circular economy (e.g. 3Rs in Japan, and circular economy in PRC)
- Integrated decision making mechanisms (e.g. sector-wide approaches)”

In short, environmental valuation is relevant to much of the GEO-4 and examples from Western Africa will highlight its relevance in some of the most fragile and threatened ecosystems and communities.

9.2. Linkages to issues selected by policymakers

Please note that the *Statement by the global intergovernmental and multistakeholder consultation on the fourth Global Environment Outlook, held in Nairobi on 19 and 20 February 2005* should be available at:

<http://dewa03.unep.org/geo/tiki-index.php>

A copy is also available upon request. The page numbers referred to below are page numbers in the statement document.

Page 2

Section B on the objective, scope and overall outline of the fourth Global Environment Outlook Report, notes matters of relevance to environmental valuation including:

“Assessing interlinkages between major environmental challenges and their consequences for policy and technology response options and trade-offs, identifying success stories and lessons learned, and assessing opportunities for technology and policy interventions for both mitigating and adapting to environmental change;

“Assessing challenges and opportunities by focusing on certain key cross-cutting issues inter alia as they relate to those included in the **Bali Strategic Plan for Technology Support and Capacity-building** relating to how environment can contribute to the sustainable development goals and targets and how environmental degradation can impede progress towards those targets, with a focus on vulnerable groups, species, ecosystems and locations, ...

“Assessing environment for human well being and prosperity, focusing on the state of knowledge regarding the effectiveness of various approaches to overarching environmental policies, in particular mainstreaming environmental concerns into the plans and policies of social and economic dimensions of sustainable development including major sectors and enforcement of and compliance with multilateral environmental agreements ...”

The Bali Plan includes a commitment to “promote, facilitate and finance access to and support of environmentally sound technologies and corresponding know-how.” The application of environmental valuation techniques and the application of valuation knowledge is relevant here.

Page 3

Regarding **section C on key questions** for the fourth Global Environment Outlook report, the statement asks questions pertinent to the use of environmental valuation:

“Where do we stand in the evolution of ideas and concepts on the environmental dimensions of sustainable development?”

“How does the fourth Global Environment Outlook deal with the multidimensional, multiscalar, multidisciplinary and temporal nature of the interactions between environment and society?”

“How does the environment contribute to sustainable development, human well-being, prosperity and alleviation of poverty, and which groups and geographical areas are vulnerable to environmental change?”

In preparation of the valuation report and its inclusion into GEO4 these questions need to be kept in mind.

Regarding challenges and issues, the statement presents a long list:

- “biodiversity;
- freshwater;

- coastal and marine areas;
- forest;
- land;
- desertification;
- mountain areas,
- urban areas;
- polar areas;
- atmosphere;
- disturbed bio-geochemical cycles:
- chemicals:
- waste; and
- natural and human induced hazards and conflicts, including peace and security.”

Most of these are covered in the comprehensive outline.

Further issues are highlighted in the statement in the context of the MDGs:

“How is the environment contributing to the implementation of the internationally agreed development goals, including those contained in the Millennium Declaration, in areas such as:

human health,
 food security,
 poverty alleviation,
 energy, and
 disaster-preparedness?”

The statement also addresses the important topic of interlinkages with questions relevant to valuation such as:

“What are the key interlinkages between the various forms of environmental change and human activities? ...”

“How are the human drivers, activities and impacts interlinked and to what extent can they be decoupled in order to change the human-environment interaction if need be?”

Regarding environment for development, the statement asks questions to which environmental valuation can play a significant role:

“What instruments exist to mainstream environmental concerns into social and sectoral plans and policies, including contributing to sustainable-development and poverty-reduction strategies?”

“How do we address the need for science, data, indicators, monitoring and assessment to measure progress towards the environment dimension of the Millennium Development Goals?”

A challenge for the GEO-4 report is to build an awareness of and indeed a demand for environmental valuation research and studies among decision-makers. To do so, valuation research and studies – particularly in Western Africa – will need to be directly linked to policies for sustainable development and poverty alleviation.

10. Annotated bibliography

This bibliography includes the documents referenced directly in this report as well as other documents which are directly or indirectly relevant to the topic of economic valuation in western Africa.

In general each document is listed by institution and date, title, and author(s). As appropriate, the listing is followed by a short comment.

Most of the documents listed in this bibliography are available on the internet and can be found by searching with Google. Documents which cannot be found on the Internet or elsewhere can be obtained upon request from the author of this report.

10.1. General valuation references

Valuation was on the agenda of the November 2005 SBSTTA 11 meeting of the Convention on Biological Diversity. The following three papers produced by the CBD Secretariat provide a solid overview of biodiversity valuation:

CBD, 2005a

Incentive measures: Proposals on the application of tools for valuation of biodiversity and biodiversity resources and functions
UNEP/CBD/SBSTTA/11/9

CBD, 2005b

Incentive measures: An exploration of tools and methodologies for valuation of biodiversity and biodiversity resources and functions
UNEP/CBD/SBSTTA/11/INF/8

CBD, 2005c

Synthesis report on information received from Parties, other governments and organizations on non-monetary positive incentive measures and on the application of methodologies for the assessment of values of biodiversity and its functions

UNEP/CBD/SBSTTA/11/INF/15

also:

CSERGE, 2002

Valuing nature: Lessons learned and future research directions

R. Kerry Turner, Jouni Paavola, Philip Cooper, Stephen Farber, Valma Jessamy, and Stavros Georgiou

(A critical review of the environmental valuation literature to assess the policy relevance of valuation studies; CSERGE Working Paper EDM 02-05.)

Duke University, 1996

Pricing what is priceless: A status report on non-market valuation of environmental resources

V Kerry Smith

(An academic update on valuation.)

IUCN, 1998a

Economic values of protected areas: Guidelines for protected area managers

WCPA taskforce on economic benefits

(Introduces protected area managers to the concepts, methodologies, and language of economic valuation and includes a selection of case studies.)

IUCN, 2000

Lessons learned from environmental accounting: Findings from nine case studies

Joy Hecht

(Aims to shed light on environmental accounting through nine country case studies; Norway, The Netherlands, Sweden, France, Canada, The Philippines, Namibia, Germany, and the United States.)

IUCN, 2001a

How economic valuation can pay for conservation

Frank Vorhies

(A short introduction to economic valuation and how we can use it to assess the benefits of ecosystem conservation as well as how these benefits are distributed among the stakeholders.)

OECD, 2002a

Handbook of biodiversity valuation: A guide for policy makers

OECD working group on economic aspects of biodiversity

(Describes the types of values usually associated with biodiversity. While there are exceptions to the need to prioritise economic values over other cultural, traditional and spiritual values, economic valuation has a sound theoretical foundation that can help clarify the tradeoffs implicit in public policy decisions. Also available in French.)

UNDP, 2005a

Investing in environmental wealth for poverty reduction

David Pearce, lead author

(Examines the economic case for investing in the environment, as a contribution to poverty reduction; argues that the environment is not a luxury good, which poor countries can do without, but an essential part of strategies to reduce poverty and foster sustainable growth.)

UNDP, 2005b

Sustaining the environment to fight poverty and achieve the MDGs: The economic case and priorities for action

David Pearce, lead author

(Examines the economic case for investing in the environment, as a contribution to poverty reduction; attempts to identify what environmental interventions contribute most efficiently to poverty reduction, in terms of net benefits to the poor.)

WBCSD, 2002

Business and biodiversity: The handbook for corporate action

Frank Vorhies, lead editor

(Provides information on the business case for biodiversity, an overview of hot issues, and guidance on biodiversity management strategies.)

World Bank, 2004a

How much is an ecosystem worth? Assessing the economic value of conservation

Stefano Pagiola, Konrad von Ritter and Joshua Bishop

(Seeks to clarify how valuation should be conducted to answer specific policy questions.)

World Bank, 2004b

Assessing the economic value of ecosystem conservation

Stefano Pagiola, Konrad von Ritter and Joshua Bishop

(Seeks to clarify how valuation should be conducted to answer specific policy questions – specifically, determining the value of the total flow of benefits from ecosystems, determining the net benefits of interventions that alter ecosystem conditions, examining how the costs and benefits of ecosystems are distributed, and identifying potential financing sources for conservation.)

WWF, 2005a

The green buck: Using economic tools to deliver conservation goals, a WWF field guide

Tom Le Quesne and Richard McNally

(Provides an introduction for the non-specialist to some of the approaches that economics can offer; sections include financing conservation, creating markets that support conservation, and influencing policies and plans.)

10.2. Biodiversity valuation references

This section contains some general references on biodiversity valuation.

IUCN, 1994

The economic value of biodiversity

David Pearce and Dominic Moran

(A classic book on the topic; began life as a 1993 report to IUCN. Asks why biodiversity disappears and how its economic value might be captured by various institutional mechanisms.)

IUCN, 1996a

Using economics to attack biodiversity loss

Frank Vorhies

(Outlines a framework of seven steps for biodiversity impact assessment: identify an impact, establish the causes, determine the winners and losers of the impact, propose mitigation, determine the winners and losers of mitigation, implement mitigation measures, and monitor and evaluate.)

IUCN, 1996b

Slowing tropical forest biodiversity losses: Cost and compensation considerations

Randall Kramer

(Discusses work on cost estimation for protected areas in the tropics.)

IUCN, 1999a

Building economics into national biodiversity strategies and actions plans - Experiences from eastern Africa

Lucy Emerton

(This paper describes experiences gained in building economic concerns and concepts into NBSAPs in Eastern Africa.)

UNEP, 2000

The valuation of biodiversity for national biodiversity strategies and action plans

Dominic Moran and Camille Bann

(Provides guidance to trainers for the contents of workshops on biodiversity valuation.)

10.3. Water ecosystem valuation references

This section contains some general documents on water ecosystems valuation including topics such as inland waters, coastal areas and marine.

Duke University, 2005

Economic tools for valuing freshwater and estuarine ecosystem services

Randall Kramer

(Reviews the growing body of research on the economic value of ecosystem services, focusing specifically on water quality and quantity.)

IDRC, 1999a

Blue pricing of undersea treasures

Jack Ruitenbeek

(Reviews the needs and opportunities for environmental economics research on coral reef management in South East Asia.)

IDRC, 1999b

Blue pricing of undersea treasures - annexes

Jack Ruitenbeek

IUCN, 1998b

Capturing the hidden values of wetland ecosystems as a mechanism for financing wise use of wetlands

Gayatri Acharya

(Focuses on the use of economic valuation as an incentive for wetland conservation.)

IUCN, 2004

Value: Counting ecosystems as a part of water infrastructure

Lucy Emerton and Elroy Bos

(A practical guide explaining the most important steps and techniques for the valuation of ecosystem services, and the incorporation of its results in decision-making. It explains, step by step, how to generate persuasive arguments for more sustainable and equitable development decisions in water resources management.)

OECD, 2002b

The biodiversity benefits of coral reef ecosystems: Values and markets

Herman Cesar

(Gives some background to economic valuation and market creation and presents three case studies)

Ramsar, 1997

Economic valuation of wetlands: A guide for policymakers and planners

Edward Barbier, Mike Acreman and Duncan Knowler

(A now classic guide for policy makers and planners on the potential uses for economic valuation of wetlands and how such valuation studies should be conducted. Provides details of the various techniques and examples of wetland valuation studies together

with guidance on planning and managing a study and putting the result into a wider decision-making framework. Also available in French and Spanish.)

UNOPS, 2005a

Benguela Current Commission (BCC) economic study

Ussif Rashid Sumaila, Gordon Munro and Heather Keith

(The main purpose of this study is to analyze the economics of fishery management and other marine industries in the Benguela Current Large Marine Ecosystem (BCLME), reviewing the case for and against regional co-operation in managing the BCLME.)

UNOPS, 2005b

BCC economic study summary

Ussif Rashid Sumaila, Gordon Munro and Heather Keith

WWF, 2001

An economic valuation of the terrestrial and marine resources of Samoa

Mohd Shahwahid and Richard McNally

(The Samoan authorities, in collaboration with WWF, commissioned research into the economic value of Samoa's marine and terrestrial resources, particularly forests. The findings and lessons learned are presented in this report.)

Wildlife Society of Southern Africa, 1993

An ecological economic review of the environmental impact assessment of conserving or mining the St Lucia Dunes

Frank Vorhies and Deborah Nolte Vorhies

(Analysis covers several essential areas relevant to the economics of conserving or mining the dunes. These include ownership of the dunes, returns from the two land use options, employment opportunities, foreign exchange earnings and tax revenues.)

10.4. Case studies - western Africa

Cameroon

IUCN, 2003a

Waza Logone floodplain, Cameroon: Economic benefits of wetland restoration

Lucy Emerton

(Describes an exercise undertaken to assess the economic effects of floodplain degradation in the Waza Logone region of Cameroon. Presents an economic justification for government and donor investment in flood release measures to restore the hydrology and biodiversity of the floodplain.)

WWF, 2002

Feasibility study on financing mechanism for conservation and sustainable management of central African forests

Melissa Moye and Brigitte Carr-Dirick

(Prepared at the request of the ministers in charge of forests of central Africa (COMIFAC). Analyses opportunities and constraints for introducing new financial mechanisms.)

Nigeria

IIED, 1997

The economic importance of wild resources in the Hadejia-Nguru wetlands in Nigeria

Derek Eaton and Marie-Thérèse Sarch

(Presents the results of a training workshop and field study undertaken to assess the economic importance of the major wild resources harvested within the wetlands using participatory appraisal techniques.)

Senegal

Harvard University, 1997

Theorizing access: Forest profits along Senegal's charcoal commodity chain

Jess Ribot

(Examines the distribution of benefits from Senegal's charcoal trade and the multiple market mechanisms underpinning that distribution.)

IUCN, 2003b

The economic value of wild resources in Senegal

Cheikh Oumar Ba, Joshua Bishop, Moustapha Deme, Hamet Diaw

Diadiou, Alioune B. Dieng, Oumar Diop, Pedro Andres Garzon,

Moustapha Kebe, Oumou K. LY, Vaque Ndiaye, Cheikh Mbacké Ndione,

Astou Sene, Djiby Thiam, and Ibrahima A. Wade

(This draft report presents a summary of findings of recent research on the value of non-timber forest products, game, and freshwater fisheries in Senegal, West Africa. The research is based on new data gathered from producers, traders, and consumers of wild plant and animal products.)

IUCN, 2003c

Summary of the Djoudj and Diawling valuation studies

Oumou Koulsoum Ly et al

(A summary in French of the results of the valuation studies of the Djoudj and Diawling National Parks. Beyond their impact on fauna and the flora, the restoration, installation and management projects of these national parks improved visibly the social conditions of the local populations and strongly favoured the development of many economic activities in the delta of the Senegal River.)

IUCN, 2003d

The draft report of the valuation study of Djoudj National Park

Oumou Koulsoum Ly et al

IUCN, 2003e

The draft report of the valuation study of Diawling National Park

Oumou Koulsoum Ly et al

10.5. Case studies – rest of Africa

Eastern Africa

IUCN, 1996c

The opportunity costs of protected areas in Uganda

Peter Howard

(Assesses in financial terms the opportunity cost of excluding human settlement, cultivation and pastoral activities from Uganda's National Parks, Game Reserves and Forest Reserves.)

University of Alberta, 2005

Biodiversity and nature-based tourism: The potential for sustainable development in Uganda

(More detailed staff paper of a study quantifying the costs and benefits of avian biodiversity at a rainforest reserve in Uganda)

WWF, 2005b

Economic benefits of biodiversity exceed the costs of conservation at an African rainforest reserve

Robin Nairoo and Wiktor Adamowicz

(Reports on a study quantifying the costs and benefits of avian biodiversity at a rainforest reserve in Uganda)

Southern Africa

CSERGE, 2001

Private supply of protected land in Southern Africa: A review of markets, approaches, barriers and issues

Wolf Krug

(A first attempt to assess the role of the private sector in supplying protected land or 'land under wildlife' in southern Africa.)

EcoPlus, 1993

Introducing lion into Pilanesberg: An economic assessment

Deborah Vorhies and Frank Vorhies

(Focuses on the economic impacts of introducing lion. Quantifies the expected benefits and the expected costs from their introduction.)

IIED, 1998

Economic valuation of communal rangelands in Botswana: A case study

Jaap Arntzen

(This paper undertakes a valuation exercise in an effort to address causes of under-valuation. The objective is to estimate the annual direct use value of an average hectare of communal rangeland in Botswana, based on an analysis of secondary data. The exercise incorporates the three major direct uses, both marketed and non-marketed, of rangelands - livestock, wildlife and gathering.)

10.6. Case studies – out of Africa

IUCN, 2001b

Economic valuation of biodiversity in Oman

Rasool Al-Jabiri

(Highlights the economics value of biodiversity in Oman through a simple quantitative model.)

Indian Institute of Forest Management, 2000

Economic valuation of forests in Himachal Pradesh

Madhu Verma

(Generates economic values for various goods and services provided by the forests.)

Indian Institute of Forest Management, 2001

Economic valuation of Bhoj wetland for sustainable use

Madhu Verma, Nishita Bakshi and Ramesh P.K. Nair

(Captures the values of the wetlands in the perspectives of the various stakeholders.)