

The World Bank Group

2010 Environment Strategy

Analytical Background Papers

Valuation of Ecosystem Services in World Bank Group Work

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1. Context

The World Bank Group's new Environment Strategy will identify key areas in which the WBG should engage to support its internal and external client base to: i) more effectively address environmental priorities and move toward greater environmental sustainability; and ii) identify best approaches to pursue the environmental sustainability of the Bank Group's operations. The preparation of the Environment Strategy is underpinned by a series of analytical background papers that emerged from the feedback received during internal consultations and review of the Environment Strategy concept note. This background paper addresses valuation of ecosystem services in World Bank work.

2. Background

In 2005, the Millennium Ecosystem Assessment (MA, 2005) provided the first comprehensive report on global ecosystems, the dependence of human societies on the services they provide, their current state, and likely future trajectory. Despite their importance for human well-being, ecosystems are deteriorating worldwide, and with them, the capacity to support human well-being, a problem that is exacerbated by climate change. The Millennium Ecosystem Assessment identified the failure to value ecosystem services as a major contributing cause. It further proposed that part of the solution lies in policy making that takes into account the full value of ecosystem services, market and non-market.

In the work of the World Bank Group, we can document cases where valuing environmental services¹ has changed policy and project design for the better (See Box 1 below); it is likely, but much harder to show, that omitting environmental valuation has led to decisions that may not support long-term economic growth. But for all operational work there has been a general decline in economic analysis and even less use of valuation of environmental services.

In a detailed review of 101 environmental projects approved between FY2000–2002 Silva and Pagiola (2003) found that two-thirds did not include any valuation of environmental impacts, and that, where valuation was done, it was often done poorly. The response was to develop valuation toolkits and conduct training sessions, notably for the costs of environmental degradation (e.g., Bolt et al., 2005). Despite the availability of toolkits and training, however, there has been little observable improvement. The World Bank's *2009 Annual Review of Development Effectiveness* on sustainable development (IEG, 2009), reports that the use of cost-benefit analysis for projects has continued to decline since the study by Silva and Pagiola (2003), and that economic valuation of environmental impacts was often not done at all.

¹ Most environmental economists in the WBG use the term "environmental services" rather than "ecosystem services." They are treated interchangeably in this paper, unless otherwise specified.

Box 1: Examples of the influence of environmental valuation on project and policy design, dialogue with client countries, and support for strengthening of environment programs and institutions

MNA: COED studies were done in almost all countries in the Middle East and North Africa with significant impacts such as:

- **All MNA countries:** COEDS were incorporated in CASs and country briefs for dialogue with client countries
- **Algeria:** the first COED in MNA, 1999. As a result, the Ministry of Finance allocated \$450 million for environmental protection
- **Morocco:** The COED led to a solid waste management DPL and a water sector DPL
- **Egypt:** COED led to strengthening of the Ministry of Environment, and increased funds earmarked for environmental protection.
- **Kuwait:** COED led to PPP on solid waste management
- **Tunisia:** The valuation of watershed benefits shed light on the best land use practices and the concrete incentives to adopt them.

Ghana: the COED for soil degradation, deforestation and human health damages from pollution, later incorporated in the CEA, resulted in the first African Environment DPL

Madagascar: a cost-benefit analysis of ecosystem services in protected areas led to tripling of the area under protection

Costa Rica: Valuation in the Regional Silvo-Pastoral project quantified benefits that helped to establish payments for environmental services

Peru: CEA resulted in the establishment of the Ministry of Environment, new regulations for air and water pollution, investment in monitoring equipment, and an Environmental DPL

Colombia: CEA with COED analysis contributed to prioritizing air and water pollution issues in its reform agenda Sustainable Development DPL II and III

Maldives: Environmental benefits including the cost of potential damages to coral reefs were included in a cost effectiveness analysis to determine the best option for a regional waste & wastewater management facility project

China: valuation of benefits to human health from improved water quality fed into the design of the Lake Gyoshi project

China: Bengbu Integrated Environmental Project valued a range of environmental benefits in determining how to provide increased water and sanitation services, including improved health benefits and storm drainage benefits

Indonesia: CEA with values for greenhouse gases served as an input to a climate change DPL

Timor Leste: CEA included estimates of the cost of poor sanitation that were included in the country's Sanitation Policy and Strategy

Thailand: The Climate Change and Adaptation study quantifies the expected cost of climate change damage and does a CBA of adaptation options. This study has been referenced by the Bangkok Governor when launching a new flood control plan.

Sri Lanka: valuation of environmental services is assisting the World Bank in its dialogue with the government in the Ecosystems Conservation and Management Project to support conservation within designated protected areas and to extend protection to critical habitats outside protected areas.

A more recent assessment by IEG, *Cost Benefit Analysis in World Bank Projects* (IEG, 2010a), confirmed the serious decline in economic analysis in World Bank operational work. It noted that in the 1980s, 70 percent of projects included a cost-benefit analysis, while this figure had dropped to 25 percent by the early 2000s. The report further noted that although nearly every

project appraisal document discusses environmental impacts and mitigation measures, only 13 percent of the documents included environmental costs and benefits in the economic analysis.

The 2001 Environment Strategy did not explicitly address environmental valuation, although the focus on poverty and environment implies a need for valuing natural resources and environmental services.² In consultations on the 2010 Environment Strategy, a wide range of stakeholders stressed the importance of mainstreaming environmental services. Global initiatives such as The Economics of Ecosystems and Biodiversity (TEEB)³ have also raised expectations about our ability to value non-market environmental services. Greening development—the overarching principle of the new Environment Strategy—cannot be achieved without a substantial emphasis on environmental valuation. Greening development is based on the efficient use of natural capital—the natural resources and ecosystem services that underpin economies.

The Changing Wealth of Nations (World Bank, 2010), shows that developing countries are highly dependent on natural capital. In these countries, natural capital accounts for an average of 20 percent of total wealth, rising to 30 percent in low-income developing countries, compared to 2 percent of wealth in high-income countries. Development is, in part, a process of leveraging natural capital to build wealth in the form of produced capital and human and institutional capital. Promoting growth and poverty reduction requires taking into account the full value of environmental services and natural capital.

But proper valuation can require costly data collection, and valuation does not bring the same benefits to all projects. Furthermore, relatively few World Bank staff have extensive experience in conducting environmental valuation exercises, or the budgets for hiring experienced consultants. To better direct limited resources for environmental valuation and training, a closer look is needed to identify the conditions under which valuation has had an impact on: policy and project design, policy dialogue in client countries, environmental investments, and strengthening the capacity of national institutions. While the studies referred to earlier have assessed the use of environmental valuation, none of them addressed the impact of environmental valuation.

This report presents a review of environmental valuation in World Bank operational and analytical work, identifying what has been done and the impacts environmental valuation has had. The report goes on to identify the conditions under which valuation is most likely to influence decision-makers, and finally, the implications for the 2010 Environment Strategy.

3. Our Approach: Learning from Past Experience

The core work of the World Bank is its operational activities, mainly project and development policy lending. Including environmental valuation in operational work can have a direct impact

² Environmental valuation was mentioned only twice in the entire document.

³ See www.teebweb.org for reports.

on project design and implementation. But the analytical work of the World Bank is also important because of its potential to influence policy dialogue with client countries that sets priorities for project lending, policy reform, and institutional strengthening such as increased support for environment ministries.

A review of operational and analytical work was carried out based on 1) a desk study of analytical and operational work and 2) interviews with Task Team leaders (TTLs). The desk study allowed us to determine how often environmental valuation was included, which environmental services were valued, and which were not. But it couldn't tell us what the impact of valuation was, or why a TTL decided to include, or not include, environmental valuation. For this, the interviews with TTLs were essential.

To understand the reasoning and constraints faced by TTLs, as well as to understand the policy impacts, we held extensive discussions with more than 40 TTLs (mainly economists and environmental specialists), who shared their experiences over many years' work in the World Bank, and provided a rich understanding of environmental valuation at the Bank. TTLs provided examples of good practice in environmental valuation and identified the impacts of environmental valuation in client countries. Often the impacts were indirect, especially in the case of analytical work. Interviews with TTLs also helped us to identify the following:

- Conditions influencing the decision by the TTL to include or omit environmental valuation in analytical or operational work.
- Conditions affecting the likelihood that good valuation would influence decision-making in the client country.
- How the World Bank can improve environmental valuation to provide better support to client countries

To put the WBG work in perspective, interviews were also held with practitioners in more than a dozen institutions outside the WBG to understand their experience with environmental valuation.

We begin our assessment with a review of environmental valuation in World Bank analytical work, since it is the analytical work that usually determines lending activities in a given country. This is followed by an assessment of environmental valuation in operational work.

a. Environmental valuation in analytical work

Analytical work mapped to the environmental theme is quite extensive and varied. There is, however, a key component of the analytical work—the Country Environmental Assessment (CEA)—that is especially important because it aims to systematically integrate environmental issues into the Bank's country programming and policy dialogue, feeding into country strategies (CASs and CSPs), poverty reduction strategy papers (PRSPs), development policy lending (DPL), and country-level development assistance strategies and programs (Pillai 2008). CEAs can bring

together the results of environmental, economic, and sectoral work and facilitate dialogue, both within a country and among development partners. CEAs typically have three methodological building blocks: (i) state of the environment and priorities for development, (ii) policy analysis including links to the macro economy (with tools such as the World Bank's Adjusted Net Saving) and sectoral analysis including cost of environmental degradation (COED) and analysis of sectoral issues and interventions, and (iii) institutional analysis including public expenditure reviews. A full CEA is not done in every case; sometimes a CEA may only focus on institutional assessment or on a specific sector rather than the entire economy.

The second component of CEAs is of particular importance. The costs of environmental degradation typically estimate the cost of damage to human health from air or water pollution, soil degradation (due to salinization or erosion), deforestation, depletion of minerals, and sometimes the willingness to pay for various services. In some cases, COEDs have been carried out as studies in their own right, for example in Ghana and many countries in the Middle East and North Africa (Croitoru and Sarraf, 2010). The CEAs then draw on the information in the COEDs. In some instances CEAs drew on COEDs carried out by other institutions. For example, the CEA for Indonesia drew on a COED done by the Asian Development Bank.

Our literature review of World Bank analytical work focused mainly on environmental valuation in the CEAs and the stand-alone COEDs, because this analytical work is designed specifically to feed into operational work. The review includes 28 CEAs completed in the period 2003-2009 (Table 1, and Annex 1) and also drew on a review of CEAs by Pillai (2008) and an extensive review of the experience with COEDs in the Middle East and North Africa region (Croitoru and Sarraf, 2010). In addition, a survey was conducted of all TTLs leading additional analytical work in Environment as well as Agriculture, Energy and Mining, and Water Sectors in the period FY08-10 to identify any additional analytical work where environmental valuation was carried out, such as Environment Policy Notes. Interviews with TTLs provided lessons from all analytical work, not just the CEAs and COEDs.

Twenty-two of the 28 CEAs included some environmental valuation, mostly costs of environmental degradation that focused on human health damage from pollution (see Annex 1). Several included broader assessments including valuation of the depletion of natural resources (forests, fisheries) and land degradation. A few applied cost-benefit analysis to some components of environmental damage. Eleven of the CEAs with environmental valuation also included Adjusted Net Savings (ANS), the World Bank's macroeconomic indicator of sustainable development. ANS provides macroeconomic estimates of pollution damages, deforestation and depletion of minerals and energy resources. When a COED is not available, ANS can provide an estimate of pollution damages. Another eight CEAs are ongoing or planned; seven will include environmental valuation.

Table 1: CEAs Reviewed for Environmental Valuation

CEAs including Environmental Valuation	CEAs not including any Environmental Valuation
Belarus, 2003	Ethiopia, 2004
Serbia and Montenegro, 2003	India (National), 2007
Dominican Republic, 2004	India (North East), 2007
Tunisia, 2004	India (Orissa State), 2007
Egypt, 2005	Namibia, 2008
Bangladesh, 2006	Vietnam, 2008
Colombia, 2006	
El Salvador, 2006	
Pakistan, 2006	
Ghana, 2007	
Nigeria, 2007	
Guatemala, 2006	
Ecuador, 2007	
Honduras, 2007	
Peru, 2007	
Nepal, 2007	
Senegal, 2008	
Tajikistan, 2008	
Indonesia, 2009	
Philippines, 2009	
Timor Leste, 2009	
Jordan, 2009	

Environmental valuation in analytical work can have very wide-ranging influences. In some instances, the COEDs/CEAs *directly influenced the policy dialogue* with client countries through the CASs. For example, based on the COED for Lebanon, the country CAS included a pillar on natural resources and the environment. Similarly, the COED for Morocco provided important support for including improved water management and sanitation as one of the four key objectives in the CAS.

In other cases specific *lending activities emerged from COEDs/CEAs*. For example, based on dialogue over the Energy Environment Review in Egypt, the World Bank and the government agreed to the Second Pollution Abatement Project and the COED in Jordan contributed to the Amman Solid Waste Management Project. A number of DPLs, including Ghana and Colombia (Box 2), cite the CEAs and include their recommendations.

Valuation studies can influence the policy and reform agenda in a country, leading the country to *strengthen country environmental institutions*. For example, the Algerian COED resulted in government commitment of \$450 million in 2001–2004 to implement institutional reforms and investments in the environment sector. Similarly, The CEA for Peru provided important support for the establishment of the Ministry of Environment in Peru, the budget support programs for forestry in Cameroon and Gabon. Environmental institutions outside government are also important. In Colombia, the media picked up on the costs of environmental degradation identified in the CEA and was instrumental in building support in civil society for environmental

regulation and reform. Measures for regulating air and water pollution have since been introduced.

CEAs/COEDs can also *influence client country practices*, leading them to include the environment in analysis and strategic planning activities. For example, partly under the influence of the COEDs, the Syrian Arab Republic included in its 10th 5-Year Development Plan a requirement that environmental valuation be included in all environmental policies and programs. Colombia's National Development Plan cites the figures from the CEA in its call for sustainable development policies.

Box 2: CEAs Influence Development Policy Lending

Colombia

In Colombia, the government had requested a sustainable development DPL to help implement the priorities set forth in its national development plan. The Bank was already conducting a dialogue with the country on environmental issues, but analytical work was needed to provide the basis for a long-term programmatic policy and investment program, and a CEA was accordingly initiated as a part of its first DPL program. In the Colombia CEA, analysis of the cost of environmental degradation found that among the most important environment-development problems were urban and indoor air pollution; inadequate water supply, sanitation, and hygiene; natural disasters such as flooding and landslides; and land degradation. The burden of the associated costs, the equivalent of nearly 4 percent of gross domestic product (GDP), fell most heavily on vulnerable segments of the population, especially poor children under five years old. Based on key findings and recommended policy reforms from the CEA, the Colombia Sustainable Development DPL II and III was aligned to support air and water pollution regulation reform.

Ghana

The Ghana CEA highlighted significant impacts mainly in soil, forests, health (water). The CEA led to the Natural Resources and Environmental Governance DPL which identifies reforms needed to strengthen the forestry and mining sectors.

b. Environmental valuation in operational work

For operational work, following the approach of Silva and Pagiola (2003), the review covered PADs for all 97 projects in the period FY2008-2010, under both investment and concessional lending, that were coded as "core" environment and natural resources management projects, i.e., with investment of at least 65 percent in the ENRM theme areas.⁴ The 'Environment and Natural Resources' thematic group includes the following sub-themes: biodiversity, climate change, environmental policies and institutions, land management, pollution management and environmental health, water resources management, and other environmental and natural resources management. The portfolio of 97 projects, listed in Annex 2, includes 80 investment lending projects (including IBRD, IDA and GEF projects), 8 development policy lending (DPL) projects, and another 9 projects (IDF, Montreal protocol and other financial products).

⁴ Our assessment focused on 2008-2010 since Silva and Pagiola (2003) covered 2000-2002, and the IEG report reviewed economic analyses conducted for the complete sample of 51 ENRM projects which were approved in 2000 and closed in 2007 and 2008.

Only investment lending projects are mandated to include cost-benefit analysis and are discussed in detail in this section. DPLs aim to assist World Bank clients in achieving sustainable poverty reduction through a program of policy and institutional reforms and, because of their focus on institutions and policy, are not mandated to include an economic analysis. Although DPLs do not themselves include environmental valuation, all but one of the eight DPLs have drawn on analytical studies that include environmental valuation, mainly Country Environmental Analysis (CEAs) and cost of environmental degradation studies, as discussed previously.

Table 2: Projects including Environmental Valuation, 2008-2010

Sector	Number of projects	Environmental services included
Energy	8	Global benefits from reduction in carbon emissions. Human health benefits from increased water availability and reduced water pollution; increased amenity value of lake, benefits from improved water flow control (reduction of flood damage, increased agricultural productivity due to irrigation)
Water	3	
Transport	2	Global benefits from reduction in carbon emissions.
Agriculture, fishing and forestry	3	Global benefits from carbon sequestration for forestry, methane reduction for agriculture.
Solid Waste Management	2	Human health benefits and reduced losses of livestock from improved solid waste management.
Biodiversity	1	Value of coral reef ecosystem services (individual services not identified; a single value applied via benefits transfer intended to capture total economic value)
Land Management	2	Human health benefits from soil clean up
Total	21	

Source: Authors' analysis

Of the 80 investment lending projects, 53 included some level of economic analysis, and 21 of these included some environmental valuation.⁵ Table 2 summarizes environmental valuation in these projects. Environmental valuation focused mostly on human health benefits and reduction of greenhouse gas emissions. Energy and Transport projects included an estimate of the global economic benefits from reductions in carbon emissions, but did not include other potential benefits such as the improvement of human health from reduction of emissions of particulate matter, NO_x and SO_x. Lending projects in forestry and agriculture estimated greenhouse gas-related benefits, but not other ecosystem services that forestry can provide. Water and biodiversity projects included a broader approach to environmental valuation.

The influence of environmental valuation in project design is not always easy to identify because a PAD doesn't always include a detailed analysis of alternatives considered and the role of environmental valuation in deciding among alternatives. Two examples, in Box 3, show that environmental analysis was important in the decision about how to design the project. Both of

⁵ In some projects, the PAD economic appraisal implies that environmental values have been included in the assessment, but no explanation or figures are provided. These projects are treated as having no environmental valuation.

these projects are relatively complex, with many components, and in the case of Matanza, politically sensitive. In the Matanza case, the environmental valuation was not only useful from a technical point of view—identifying the best option while taking into account water environmental services, but it was also important for building a positive dialogue with civil society. Sound environmental valuation indicated that the environmental impacts were being taken seriously.

Box 3: Environmental Valuation in Investment Projects

Bengbu, China Environmental Management Project

The objective of the Bengbu Environmental project was to improve the effectiveness of selected urban environmental services delivered by the Bengbu Municipality through investment in water resources management, environmental and urban infrastructure improvement, and institutional development and capacity building.

A Willingness-to-Pay survey was carried out to help understand public support for the environmental improvements to be provided by the project. Cost-benefit analysis was carried out for each project component, wherever possible. When significant environmental improvements were identified, but benefits were difficult to measure, a cost-effectiveness approach was used to determine the least-cost means to achieve the improvement. The feasibility study showed that the project would generate a large range of economic benefits including increased or improved water supply and sanitation services, improved water quality and associated health improvement, agricultural production increases from better flood control and irrigation water supply systems, and improvements in the amenity value of the lake.

The Argentina Matanza-Riachuelo Basin Sustainable Development Project

The Argentine court had mandated a cleanup of the river, and environmental valuation played a major role in assessing the tradeoffs among different ways to achieve this. For the sanitation component, for example, a variety of technical alternatives for the level of wastewater treatment, the length of outfalls, and the number and location of the wastewater treatment plants were considered. The project was highly publicized and there was controversy over the decision to adopt a relatively low level of treatment consisting of preliminary treatment of wastewater coupled with effluent discharge through a long outfall. This decision was challenged by several NGOs who argued for a higher level of treatment. The alternative was found to be much more expensive with very little added environmental benefits. On the basis of the cost-benefit analysis, this alternative was rejected. Sites to monitor water quality were established so that if water quality was not up to standard additional treatment units would be installed. The environmental valuation was useful not only for making the choice of level of treatment, but also for dialogue with civil society, to show that the project and its different options had been examined carefully.

TTLs were asked to explain why environmental valuation was omitted, or why only some environmental benefits were valued. The simplest answer is that the project was economically justified already, so there was nothing to be gained by adding environmental benefits. Why go to the trouble of doing environmental valuation (especially given scarce resources for analytical work) when it would not change the argument for project approval? On the other hand, TTLs stated that sometimes environmental benefits are either too difficult to value or that they lack the information necessary to do so (or resources and time to collect the information).

4. What is valued and what is missing— are we covering ecosystem services?

We often began our discussions simply by asking TTLs what aspects of the environment are most likely to be included in a valuation, and which are most often not included. We found that environmental valuation, when done at all, was heavily weighted toward pollution damages to human health, and there are many other opportunities for providing environmental valuation that better informs the country management unit and the client country. The major findings and recommendations for improvement are discussed below.

Measuring the cost of pollution damages to human health has had strong policy impact

Valuation is most often done for damages to human health from air and water pollution, the work is generally well done, and the WBG has been very successful in reaching policy-makers with this information. The example of the CEA in Colombia, where the magnitude of the economic cost of pollution damages galvanized civil society and politicians to push for change, has been repeated in many other countries. Similar success stories can be found for environmental valuation in many countries the World Bank has worked with, especially in the Middle East and Northern Africa, where the COEDs were included in all CASs and country briefs (Croitoru and Sarraf, 2010). TTLs focus on pollution damages to human health for two reasons: a) international data for valuation are readily available and methodologies are fairly robust, b) there is a perception that human health damages are very large and more likely to engage decision-makers than values for damages to ecosystem services.

...but other ecosystem services are often missing

Relatively little work is done on ecosystem services other than pollution. The value of ecosystem services tends to be highly site-specific, expensive to compile, and there is no globally available database for valuation of ecosystem service comparable to that available for pollution damages. While there have been some good individual studies, such as a Policy Note Valuation of Environmental Services in Sri Lanka which looked at agriculture and watershed benefits, TTLs often omit the value of ecosystem services from their analysis.

Emphasis has been on losses from degradation rather than the benefits from existing services.

Valuation often focuses on measuring environmental damages resulting from human activities, and this is essential for mitigating some of the most serious environmental abuses. But valuation usually does not include a comprehensive measurement of the benefits, or incomes currently generated by ecosystems. This information would help identify and support policies to better manage an ecosystem before it is degraded, rather than remediate damage after it has occurred. For example, if we know the value of coastal protection services provided by mangroves before they are lost, we may be better able to prevent loss.

Identifying winners and losers

In the effort to scale up values to the national level, the distribution of benefits and costs to different stakeholders, especially to poor households, is often lost. Distributional aspects of

valuation are important both because the WBG has a mission to reduce poverty and because the incidence of benefits has a direct impact on management of ecosystems: countless studies have shown that incentives for sustainable management are strongest when benefits accrue to those who steward ecosystems. But in many developing countries, local, often poor, communities frequently lose out to other users; when local communities do not have a sufficient economic incentive, sustainable management often fails. While distributional issues are sometimes addressed in World Bank CEAs/COEDs, this is not done systematically.

Macroeconomic consequences of environmental (mis)management

The CEAs put cost of environmental losses in a macroeconomic perspective by showing the cost as a percent of GDP. However, there are other, more comprehensive macroeconomic indicators that are not routinely included: Comprehensive wealth and Adjusted Net Savings (See *Where is the Wealth of Nations*, 2006 and *The Changing Wealth of Nations*, 2010). These can indicate whether economic growth is sustainable and can be effective in engaging Ministers of Finance and planning agencies, particularly in resource-rich countries. Most CEAs did not include Adjusted Net Savings, nor does much of the operational work. Since the CEAs can feed into the CEMs, CASs, and CPSs, they are an important mechanism to get macroeconomic indicators into the discussion of WBG priorities in client countries.

COED vs. Cost-Benefit Analysis in the dialogue for priority setting

From an economic perspective, priority setting should weigh the benefits and costs of addressing an environmental problem. CEAs currently provide information about the potential benefits from reducing environmental degradation from different sources, but there is a danger of misplaced priorities if the costs of mitigation are not also considered. Only a few CEAs included Cost-Benefit Analysis.

How can we do better?

The focus on environmental damages in COEDs/CEAs, especially to human health, has been highly effective in bringing about change. It is now time to build on this success and expand the scope of environmental management in several ways: i) the World Bank's approach should be forward-looking, rather than reactive, and be based on comprehensive coverage of the value of ecosystem services; ii) including the distribution of economic benefits and losses among different stakeholders, especially the poor, would make the results more useful for the design of specific interventions and policy reform, as well as to gain public support; iii) Routinely incorporating macroeconomic indicators that show the consequences of environmental (mis)management is an additional way to engage Ministries of Finance; iv) and expanding the use of cost-benefit analysis would improve dialogue about priority-setting, so that decisions are made on the basis of both the benefits and costs of reducing environmental degradation.

The scope of CEAs is usually jointly determined by the World Bank team and the client country, so implementing these suggestions may require extended dialogue with client country governments.

5. Prioritizing environmental valuation: when is it necessary, and under what conditions is it most likely to influence decisions?

Given the limited resources of the WBG and the overall decline in the use of economic analysis, we asked TTLs to prioritize where environmental valuation should be done, considering: a) characteristics of projects that make valuation an important part of engaging the client country; b) conditions in a client country that make it more open to considering environmental valuation in decision-making; and c) how valuation should be carried out in order to be successful.

Project characteristics: Certain kinds of projects require careful environmental valuation in order to determine the optimal project design, but also because they are likely to be more closely scrutinized by stakeholders in client countries, or internationally. This is especially so for large, complex projects with multiple tradeoffs and long-term impacts and for projects that are located in areas that are ecologically and politically sensitive.

Country characteristics: Environmental valuation is likely to be given higher priority in some countries than in others. In countries with strong civil society organizations (CSOs) and active public media, especially in middle-income countries, environmental valuation is likely to play an important role in the dialogue with stakeholders in the client country, showing that all options have been fully considered. Valuation is also likely to be important in countries that suffer serious local environmental damage (e.g., China, Colombia, some EU accession countries), or where high economic dependence on ecosystems is widely recognized (e.g., Mauritius and Costa Rica where eco-tourism is critical). Demand for valuation is likely to be stronger when leadership in such countries has good capacity for understanding economic analysis.

Regional initiatives can help

The Mediterranean Environmental Technical Assistance Program (METAP) was critical for initiating and supporting the COED work in MNA. METAP provided funding, as well as a regional forum for each country to share its experiences and learn from each other, increasing the demonstration effect and the motivation for all countries to join in (Croitoru and Sarraf, 2010).

EU accession-candidate countries have also carried out analytical work to value environmental services, often in relation to activities needed to meet accession requirements. For example, Croatia has taken out loans to help expand and support Croatia's preparations for EU integration in the Nature Protection Sector. The work includes valuation of protected areas and mechanisms for financing these areas in the future.

How valuation is conducted strongly affects its ability to influence decision-makers. There are numerous examples where good environmental valuation was done, but it failed to influence decision-makers because the study did not meet one or more of the following conditions:

- *Must be strongly demand-driven within the client country and supported by the Country Director.*
- *Translating analysis into actions that can be taken by client country.* Success depends on the ability of the TTL to explain valuation to the client and translate interest in valuation into action in the country. The TTLs' ability to do this was one of reasons for success of COEDs in MNA.
- *Credibility of valuation.* Rapid COEDs/CEAs have been done where there are budget or time constraints, but the resulting environmental valuation is rarely as thorough as when a full CEA is done. In some instances, a 'quick and dirty' assessment is sufficient, but in others, (e.g., Nigeria, 2007) the client perceived the environmental valuation as lacking credibility and rejected it.
- *Local ownership through involvement of local consultants.* The involvement of local consultants is also critical to creating local ownership and can increase the acceptance of the results by client countries (e.g., Ghana CEA). There have been cases (e.g., Mozambique) where good environmental valuation was done, but almost entirely by external consultants, and as a result there was no local buy-in, and the government rejected the results.

6. Why is environmental valuation not done?

There are many reasons why TTLs may decide not to do environmental valuation. In some cases there are good reasons, and the lack of valuation does not negatively affect the project. In other cases valuation of ecosystem services could potentially increase the usefulness of the product, but the scope of the work is defined too narrowly, so that valuation doesn't enter into it. Finally, there are cases where TTLs may think valuation is important but face obstacles to doing valuation.

Cases where there may *not* be a strong need for valuation:

- Sometimes the appropriate action is obvious, and the issue is to identify the most cost-effective solution. In ECA region, for example, a large part of the environment portfolio is for cleanup of damage from pollution that is so severe that valuation of damage is not needed; the issue is simply one of cost-effectiveness—finding the least expensive method for cleanup. However, it should be pointed out that even in this case, valuation can help set priorities, revealing which problem should be tackled first among the wide array of problems.
- Payments for Environmental Services (PES) projects, popular in Latin America, bring about sustainable management of ecosystems through a payment scheme negotiated between 'upstream' land managers and 'downstream' beneficiaries. The payment scheme is based on a negotiation between 'producers' of an environmental service and 'consumers,' and often an

agreement is reached without valuation of the service provided, although in a number of countries, such as Costa Rica, valuation was carried out first.⁶

- In some countries, there has already been a lot of environmental valuation done, and the country does not see the need for additional work. This was the reason that environmental valuation was not done for the India CEAs.

Missed opportunities for ecosystem services valuation

- Biodiversity projects funded by the GEF that are focused on maintaining ecosystem services and piloting PES schemes provide an opportunity for conducting economic valuation of ecosystem services. This opportunity has not been fully exploited by the Bank as the WB GEF PES portfolio supported by the GEF has remained modest to date and has been focused mainly on Latin America.
- The water, forestry and agriculture sectors seem an obvious venue for inclusion of valuation of ecosystem services, but in recent years, most of the work in these sectors has focused on a narrow definition of benefits.
 - Water: Work has focused mostly on irrigation projects, water supply and sanitation where valuation, if done, focuses mainly on the value of increased crop yields and household willingness to pay for water. Watershed management projects, which are much less common, typically look at the management and institutional issues, but often do not include an economic valuation component (IEG, 2010b).
 - Agriculture: the major focus has been on the value of increasing crop yields.
 - Forestry: the WBG's engagement in this sector has been in governance and institution strengthening in recent years, and does not look at valuation.
- Climate change co-benefits have not yet been fully exploited for their potential to include valuation of ecosystem services

Obstacles to environmental valuation

Many TTLs would like to do careful environmental valuation in some of their projects and analytical work but face one or more serious obstacles:

- Perception among TTLs that priorities for management are safeguards, procurement, and financial management but not economic analysis (IEG, 2010a).

⁶ The payment scheme is likely to be more efficient if it is based on valuation, but valuation can be costly and time consuming. It has been argued that as long as both parties can come to an agreement there is no need for valuation. But PES schemes are relatively new and parties are inexperienced in negotiating over this non-market service. Whether such agreements will hold over the long run remains to be seen.

- Lack of funding for environmental valuation: good valuation can be costly and most of the best practice environmental valuation in operational work was at least partly funded from trust funds. In the past, the PHRD trust fund was an important source of support for valuation in project preparation, but this trust fund has ended and other trust fund resources are very limited.
- Lack of information that can be readily used in operational and analytical work about the value of ecosystem services comparable to information about pollution damages to human health.
- Shortage of qualified local consultants to carry out environmental valuation.

7. Recommendations

There are a number of steps that can be taken to improve environmental valuation in the World Bank Group.

I. Improve operational work by strengthening analytical work used to set priorities

Given the relatively low priority for economic analysis in operational work in the WBG and the constraints that TTLs face, ENV should put particular focus on:

- a. Strengthening environmental valuation in the analytical work that influences dialogue with client countries to set priorities for operational work—COEDs, CEAs, Policy Notes. In part, this can be achieved by closer collaboration with other SDN departments. For example, work on the value of flood damage avoided through wetland conservation has been carried out under the Disaster Risk Reduction agenda.
- b. collaborating with PREM colleagues to make sure that this analytical work is included in their analytical work, such as the CEMs, and that the results are conveyed to country clients for preparing CASs and CPSs. This could include a pilot program with PREM to bring the environment into macroeconomics by promoting the inclusion of a Box in CEMs, CASs, CPSs on wealth accounts and Adjusted Net Savings for resource-rich countries. ECA is piloting such an approach for its CPSs.

II. Strengthen analytical work within the WBG

1. To strengthen analytical work, ENV should develop a “next generation” CEA with environmental valuation that is inclusive and forward looking and should:
 - a. Expand valuation to include the benefits and incomes from ecosystem services, not just damages due to degradation.
 - b. Include distribution of benefits and costs among different stakeholders.

- c. Include environmental macroeconomic indicators of performance, wealth and Adjusted Net Saving.
2. Funding: dedicated funding is needed for ecosystem services valuation, like PHRD or the TF that supported the CEAs. However, staff in the regions are already overstretched and AAA budgets are in decline, so there is likely to be little uptake of a new trust fund unless it contains a significant component of BB-type funding.
3. Create a training program for WBG staff on ecosystem services valuation that focuses concretely on operational issues for valuation, such as developing a framework that evaluates different valuation methods in terms of their 'time-cost-data-capacity' requirements. This may help TTLs understand what their options for valuation are and overcome the perception that these techniques are too expensive and take too long.

III. Strengthen analytical work through partnerships

1. The WBG could partner with regional initiatives that can provide a forum for promoting valuation. One opportunity is with Know-MED, a knowledge and skills development and sharing component of the Environmentally Sustainable Mediterranean Development Program, which is replacing METAP in the MNA region. This regional initiative can provide a laboratory and demonstration site to develop the expanded valuation for other regions.
2. It will be important to build local ownership and capacity for environmental valuation by partnering with regional environmental economics associations so that more local experts can participate in studies. These associations include Economy and Environment Program for Southeast Asia (EEPSEA), south Asian Network of Development and Environment Economics (SANDEE), Environment for Development (EfD), Latin American Association for Environment and Resource Economics (ALEAR), Latin American and Caribbean Environmental Economics Program (LACEEP).
3. The WBG should collaborate with other initiatives to help develop databases for valuation of ecosystem services. Such initiatives include TEEB (The Economics of Ecosystems and Biodiversity), Ecosystem Services for Poverty Alleviation, Poverty Environment Partnership, Poverty-Environment Initiative (UNDP-UNEP). The new Global Partnership for Ecosystem Valuation and Wealth Accounting provides a forum for collaboration with others to promote this agenda (see Box 4).
4. There is an opportunity to leverage work on climate change (for valuation of co-benefits), Disaster Risk Reduction (for the value of natural hazard mitigation by ecosystems), and Payments for Environmental Services projects (where valuation provides guidance for establishing markets).

Box 4: Global Partnership for Ecosystem Valuation and Wealth Accounting

The World Bank is launching a Global Partnership for Ecosystem Valuation and Accounting building on “green accounting”— the World Bank’s work on Comprehensive wealth and Adjusted Net Saving, and extensive country experience using the System of Environmental and Economic Accounts, developed under the aegis of the UN Statistics Commission. The partnership will include both developed and developing countries who will work together to:

1. Value ecosystems and their services, expressed in terms of national income and wealth accounts.
2. Incorporate natural wealth accounting in macroeconomic and sectoral development planning that links wealth and economic growth. The objective will be to build these values into national accounts and to apply at scale the incorporation of natural capital values in more conventional analysis for development finance decision-making.
3. Develop standardized guidelines for the practical implementation of natural wealth accounting that become part of official statistical guidelines that can be applied globally.

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Annex 1: CEAs that included environmental valuation

Country	Environmental valuation	Macroeconomic indicators included
Bangladesh	COED for air and water pollution, degradation of fisheries	None
Belarus		Adjusted Net Savings from World Bank data
Colombia	COED and Cost-Benefit Analysis for air and water pollution, land degradation and soil erosion, cost of natural disasters	None
Dominican Republic	Local case studies of COED for air pollution, dam sedimentation, but no national estimates	None
Ecuador	COED for air and water pollution; Estimated Annual Gross Economic Nature-based tourism values	Adjusted Net Savings from World Bank data
Egypt	COED for air and water pollution	Adjusted Net Savings from World Bank data
El Salvador	COED for air and water pollution, soil erosion, cost of natural disasters	None
Ghana	COED for air and water pollution, agricultural land degradation and deforestation (relied on prior ESW for COED)	Adjusted Net Savings from World Bank data
Guatemala	COED for air and water pollution, soil erosion, cost of natural disasters	None
Honduras	COED for air and water pollution	Adjusted Net Savings from World Bank data
Indonesia	COED for air and water pollution, impacts of climate change carried out by Asian Development Bank	Adjusted Net Savings from World Bank data
Jordan	COED and Cost-Benefit analysis for air and water pollution	Adjusted Net Savings from World Bank data
Nepal	COED for air and water pollution	None
Nigeria	COED for air and water pollution, deforestation, global cost of CO2 emissions	None
Pakistan	COED for air and water pollution, agricultural land degradation	None
Peru	COED for air and water pollution, cost of natural disasters	Asset Valuation???
Philippines	COED and Cost-Benefit Analysis for air and water pollution; Valuation of forest products; Cost of degradation for agricultural land, and for coastal and marine resources	None
Senegal	COED for land degradation; Cost-Benefit Analysis for air and water pollution	Adjusted Net Savings from World Bank data
Serbia and Montenegro		Adjusted Net Savings from World Bank data
Tajikistan	COED for land degradation, air and water pollution, lead poisoning, deforestation and the cost of natural disasters	None
Timor Leste	COED for air and water pollution	Adjusted Net savings and Comprehensive National Wealth based on World Bank and other data
Tunisia	COED for air and water pollution, soil degradation, poor management of solid waste	Adjusted Net Savings from World Bank data

Annex 2: Lending projects reviewed

Project ID	Project Title	Fiscal year	Region	Commitment amount (million US\$)			
				Total	IBRD	IDA	Grant
P098040	MZ-GEF Mrkt Led Sm r Dev (FY07)	FY08	AFR	4.5	-	-	4.5
P090789	ET- Sustainable Land Management (FY08)	FY08	AFR	9.0	-	-	9.0
P096058	3A-GEF W Afr Biosafety APL (FY07)	FY08	AFR	5.4	-	-	5.4
P071579	BJ-GEF Com.-Based Coastal Marine Biodiv.	FY08	AFR	4.3	-	-	4.3
P104225	3A-Strategic PT for Fisheries GEF (FY07)	FY08	AFR	0.7	-	-	0.7
P105830	LR-Establish of Protected Areas (FY08)	FY08	AFR	0.8	-	-	0.8
P107139	ET-Sustainable Land Mgt SIL (FY08)	FY08	AFR	16.0	-	16.0	-
P105220	TZ-Lower Kihansi Env. Mgt SIL (FY07)	FY08	AFR	3.5	-	3.5	-
P102971	GH-Environmental Governance (FY07)	FY08	AFR	20.0	-	20.0	-
P105140	3A-West Africa Biosafety	FY08	AFR	3.9	-	3.9	-
P110802	GA:Capacity building in Env. Mgt	FY08	AFR	-	-	-	-
P105229	CN-GEF-Mainstreaming Climate Change Adap	FY08	EAP	3.4	-	-	3.4
P096418	VN Land Administration Project	FY08	EAP	75.0	-	75.0	-
P099757	ID-Geothermal Power Generation Dev	FY08	EAP	2.7	-	-	2.7
P098916	CN-GEF Energy Efficiency Financing	FY08	EAP	13.5	-	-	13.5
P084874	CN- Energy Efficiency Financing	FY08	EAP	200.0	200.0	-	-
P093882	CN-Shandong Flue Gas Desulfurization	FY08	EAP	50.0	50.0	-	-
P098308	ID Conservation of Aketajawe-Lolobata	FY08	EAP	1.0	-	-	1.0
P085393	VN-GEF-Hanoi Urban Transpt Dev	FY08	EAP	6.6	-	-	6.6
P096925	CN- Bengbu Integrated Environment Improv	FY08	EAP	80.0	80.0	-	-
P087094	OREST AND MOUNTAIN PROTECTED AREA (GEF)	FY08	ECA	2.8	-	-	2.8
P099528	INT. NUTRIENT POLLUTION CONTROL (GEF)	FY08	ECA	4.8	-	-	4.8
P084605	LAKE SKHODER INTGD ECOSYST MGT GEF	FY08	ECA	4.6	-	-	4.6
P084608	NERETVA/TREBISNJICA RIVER BASIN GEF	FY08	ECA	8.0	-	-	8.0
P093775	INTEG NUTRIENT POLLUTION CONTROL	FY08	ECA	59.2	59.2	-	-
P109572	Strengthening Forest Monitoring	FY08	ECA	-	-	-	-
P104985	ARP /I-CONTAMINATED SITES REHABILITATION	FY08	ECA	74.5	74.5	-	-
P110682	ARP/III-LARGE SCALE OIL POLLUTED LAND CL	FY08	ECA	60.0	60.0	-	-
P095169	6L-Biosafety in Centers of Biodiversity	FY08	LCR	3.0	-	-	3.0
P110098	Regional Biosafety Communications	FY08	LCR	0.6	-	-	0.6
P095038	MX-GEF Integrated Energy Services	FY08	LCR	10.1	-	-	10.1
P090119	AR Energy Efficiency Project	FY08	LCR	11.4	-	-	11.4
P094715	BR GEF National Biod Mainstreaming	FY08	LCR	22.0	-	-	22.0
P098248	6A GEF-Adaptation to the Impact of Glaci	FY08	LCR	7.5	-	-	7.5
P110849	MX Climate Change DPL/DDO	FY08	LCR	501.3	501.3	-	-
P109786	PE (IDF) CONAM Institutional Capacity	FY08	LCR	-	-	-	-
P097322	Amazon Cartographic Base	FY08	LCR	4.5	-	-	4.5
P050567	EG-KUREIMAT SOLAR THERMAL HYBRID	FY08	MNA	49.8	-	-	49.8

Project ID	Project Title	Fiscal year	Region	Commitment amount (million US\$)			
				Total	IBRD	IDA	Grant
P093201	JO-PROMOTION OF A WIND POWER MARKET	FY08	MNA	6.0	-	-	6.0
P100198	1W-Critical Ecosystem Partnership Fund 2	FY08	OTH	13.4	-	-	13.4
P108078	MV Environmental Management Proj	FY08	SAR	13.2	-	13.2	-
P111160	Bhutan Environmental Institutions	FY08	SAR	-	-	-	-
P083813	DRC-GEF National Parks (FY09)	FY09	AFR	5.5	-	-	5.5
P107841	NE Community Action Program (GEF)	FY09	AFR	4.7	-	-	4.7
P100620	DRC- Forest and Nature Conservation SIL	FY09	AFR	49.9	-	49.9	-
P105881	SN-Sustainable Mgt of Fish Resources	FY09	AFR	3.5	-	3.5	-
P111097	UG:Sust Mgmt Mineral Resources (Suppl)	FY09	AFR	5.0	-	5.0	-
P111330	3A- EN Watershed Management	FY09	AFR	7.0	-	-	7.0
P092062	SN-GEF Sustain Mgt of Fish Resources	FY09	AFR	5.0	-	-	5.0
P111290	RCI-GEF Protected Area Project (PARC)	FY09	AFR	2.3	-	-	2.3
P111621	DRC:Rehab&Particip Mgt of KeyProt. area	FY09	AFR	5.7	-	-	5.7
P103298	3A-Lake Victoria Phase II APL 1 (FY09)	FY09	AFR	7.0	-	-	7.0
P083172	KE-GEF Nairobi NP Ecosystem WCL SIL (FY07)	FY09	AFR	0.7	-	-	0.7
P100406	3A-Lake Victoria Phase II APL 1 (FY09)	FY09	AFR	63.0	-	63.0	-
P113172	GH-NREG DPO	FY09	AFR	7.2	-	7.2	-
P111366	UG:EMCBP II Additional Finance	FY09	AFR	15.0	-	15.0	-
P116318	3A:SVP-Add'tial Grant Water Res. Plan &Mgt	FY09	AFR	11.2	-	-	11.2
P096556	CN-Eco-Farming	FY09	EAP	86.4	86.4	-	-
P096532	ID: Dam Operational Improvement (DOISP)	FY09	EAP	50.0	50.0	-	-
P116103	CN- Mainstreaming of WUA MES	FY09	EAP	-	-	-	-
P098654	CN- GEF-Thermal Power Efficiency	FY09	EAP	16.5	-	-	16.5
P100968	CN-Shanxi Coal Bed Methane Development	FY09	EAP	80.0	80.0	-	-
P099460	Vietnam PCB Management Project	FY09	EAP	7.0	-	-	7.0
P112291	GEF Sichuan Earthquake Emergency Project	FY09	EAP	1.0	-	-	1.0
P106906	LAND ADMINISTRATION AND MANAGEMENT	FY09	ECA	10.9	10.9	-	-
P114409	GEOFUND 2: Armenia Geothermal Project	FY09	ECA	1.5	-	-	1.5
P107992	ENERGY EFFICIENCY	FY09	ECA	7.5	7.5	-	-
P114789	IDF-AARHUS CONVENTION IMPLEMENTATION	FY09	ECA	-	-	-	-
P094233	BR GEF Espirito Santo Biodiversity	FY09	LCR	3.5	-	-	3.5
P096017	6L-GEF Sustain. Transp and Air Qualit	FY09	LCR	2.6	-	-	2.6
P114008	AR-GEF Sustain. Transp. and Air Quality	FY09	LCR	3.6	-	-	3.6
P112327	MX (Suppl) SINAP II - Fourth Tranche	FY09	LCR	5.4	-	-	5.4
P101471	PE First Prog. Environ DPL/DDO	FY09	LCR	316.8	316.8	-	-
P115101	MX Supplement to Env Sustain. DPL	FY09	LCR	401.0	401.0	-	-
P095205	BR 1st Prog. DPL for Sust. Env Mgt	FY09	LCR	1,300.0	1,300.0	-	-
P095510	MX Environmental Sustainability DPL	FY09	LCR	300.8	300.8	-	-
P101301	CO 3rd Sust. Dev DPL	FY09	LCR	450.0	450.0	-	-
P110462	AR Mining Environmental Restoration Proj	FY09	LCR	30.0	30.0	-	-

Project ID	Project Title	Fiscal year	Region	Commitment amount (million US\$)			
				Total	IBRD	IDA	Grant
P108064	JO- Energy Efficiency	FY09	MNA	0.8	-	-	0.8
P104960	JO - Amman Solid Waste Management	FY09	MNA	17.5	17.5	-	-
P105404	GZ- SOUTHERN WEST BANK SOLID WASTE MGT	FY09	MNA	8.3	-	-	8.3
P112108	Tiger Futures	FY09	OTH	1.0	-	-	1.0
P100531	Coal-Fired Generation Rehabilitation	FY09	SAR	45.4	-	-	45.4
P100584	Chiller Effcy-GEF	FY09	SAR	6.3	-	-	6.3
P112844	MSP Inst. Coord., Policy Outreach & M&E	FY09	SAR	0.7	-	-	0.7
P098151	Clean Air and Sustainable Environment	FY09	SAR	49.8	-	49.8	-
P102790	India - Chiller Energy Efficiency - MP	FY09	SAR	1.0	-	-	1.0
P108144	SN-Sustainable Land Management GEF FY09	FY10	AFR	3.2	-	-	3.2
P097818	RW - Sustainable Energy Dev. Proj (GEF)	FY10	AFR	3.0	-	-	3.0
P108941	3A-West Africa Fisheries GEF	FY10	AFR	10.0	-	-	10.0
P106063	3A-West Africa Fisheries - Phase 1	FY10	AFR	45.0	-	45.0	-
P096836	PH Mindanao Rural Dev. Program Phase II	FY10	EAP	5.1	-	-	5.1
P119799	China: Establishment of Groundwater Mana	FY10	EAP	-	-	-	-
P104670	TIEN SHAN ECOSYSTEM DEVELOPMENT	FY10	ECA	2.2	-	-	2.2
P117956	SFM through Climate Change Mitigation	FY10	OTH	1.0	-	-	1.0
P112061	Uttarakhand Watershed Management SLEM	FY10	SAR	7.5	-	-	7.5
P118499	CC Capacity Building, MoF, India	FY10	SAR	-	-	-	-
Total				4,831.6	4,075.8	369.9	385.8