

## Environmental Economics *Explained*

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### **Part 1: How Economic Valuation can help pay for Conservation**

by FRANK VORHIES

**Think of a natural forest in the tropics—a rainforest in South America, a moist mountain forest in central Africa, a coastal mangrove forest in Southeast Asia. What benefits does this forest generate and to whom? Are these benefits and the distribution of these benefits sufficient to ensure that the forest will be conserved?**

Economic valuation is one of the tools we can use to assess the benefits of forest 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 which may be threatening the existence of the forest.

Think of a natural forest as a business. Who are its customers? What goods and services are they interested in? Or are they interested in ground resources, such as cleared land for farming or the minerals under the ground? These interests may threaten the business. A business-approach to ecosystem management uses economic valuation as a practical tool to assess potential benefits and costs and to identify potential customers and threats.

Think of neighbours as customers. What goods and services do they want from the forest? Timber for building material? Timber to convert into charcoal for fuel? Non-timber products such as fruits and honey? Medicinal plants? Thatching grasses? Do they want access to lands for grazing their livestock or to watering holes during the dry season? How can we develop a profitable, sustainable relationship between the forest and its neighbours? Can the neighbours pay in cash or in kind for the goods and services they receive from the forest?

In order to put a value on the demand of neighbours—local communities and indigenous peoples—economists use participatory valuation techniques “which allow people to define forest resources within the context of their own perceptions, needs and priorities.” For example, using pictures in interviews and a radio receiver as a money unit, Lucy Emerton and Herzon Hogaka in Kenya found that a typical village woman extracts resources from the forest worth “over half as much as the annual net value of food production from her *shamba*”, showing that the forest provides a significant part of her livelihood.

Or, as may be the case, think of the neighbours as a threat. Their interest in the land for farming and ranching may far outweigh their interest in keeping the forest conserved. If they are to see the forest as a benefit, it must be a benefit to them. How can we involve the neighbours meaningfully in our business of conserving the forest? Do we offer them employment opportunities? Compensation for the lack of exploitative access? Do we make them co-managers of the forest by bringing them into the business as partners or even as shareholders?

A major threat to conserving ecosystems, including forest, savannah and wetland systems, is the demand to use the land for agricultural or ranching purposes. In the case of the Maasai lands of East Africa, the opportunity costs to the landowners for not developing their land—i.e. the difference between revenue from wildlife conservation and the foregone revenue from other, more profitable uses—are large enough to create economic incentives for landowners to develop their land for agriculture. By comparing the potential returns to farming and ranching to those of conservation, Mike Norton-Griffiths estimated that these opportunity costs were \$18.5 million per year for the Maasai group ranches.

By identifying the benefits and costs facing local communities from conserving the forest, we will be better able to minimize the threats and increase the tangible returns to the business of forest conservation.

In addition to local customary customers, think of the actual and potential commercial customers. What goods and services can be harvested sustainably from the forest and sold on the open market? Timber, of course, is a major product. Are we earning a fair rent from timber for forest conservation? Is the timber being harvested sustainably? What about commercial sales of non-timber products, including medicinal plants, honey, bush meat, and so on? Does the forest offer opportunities for photographic tourism, trekking or hunting? Also, there may be opportunities for bio-prospecting. Can we commercialize access to genetic resources in a way which promotes 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 forest. 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. To capture the non-market values, economists use techniques, such as contingent valuation analysis which uses surveys to estimate the surplus benefits to consumers, and travel cost analysis which studies the willingness of tourists to pay to visit areas. For example, in a World Bank econometric study for a tropical forest national park in Madagascar, Randall Kramer and colleagues estimated that “the tourism benefits of the park would be substantial, ranging from \$1 million to \$2.5 million.”

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 indeed customers for forest products.

The bad news is that these markets may undermine the business of 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 conservation business 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 it legal 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 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 more distant communities and more generally to the entire country? A major 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 the national economy. The forest may also be a habitat for plants and birds which have value in other parts of the country. Other indirect benefits might include the cultural or spiritual values of the forest.

Such downstream benefits may be difficult to commercialize. The transaction costs of charging separate fees to each customer for each indirect service would be prohibitive. Thus the forest manager might consider approaching the national or provincial government directly not for a subsidy, but for a payment for services rendered 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. For example, an economic assessment of wetlands in Nigeria indicated that “the economic importance of the wetlands means that there will be an economic loss (an opportunity cost) associated with any scheme that leads to degradation of the floodplain system.” Such potential losses need to be taken into consideration when proposing development projects, such as upstream dams or harvesting timber in an upstream forested watershed. (*Economic Valuation of Wetlands: A Guide for Policy Makers and Planners*, Ramsar Convention Bureau, 1996).

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. The Global Environment Facility has been set up to fund the incremental costs of providing such global benefits, i.e. the additional costs necessary to ensure that national and local projects provide global benefits. In addition, most multilateral and bilateral development assistance agencies now provide significant funds for environmental programmes and projects. Also, conservation NGOs and private foundations can be tapped for payment for global

benefits. In short, think of donors such as the World Bank, WWF or The Nature Conservancy as customers.

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 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. Economists David Pearce and Dominic Moran, reporting on the carbon sequestration value of the Amazon forest, consider the “carbon credit values” are 2-15 times the price of land in Rondonia. Tropical forest land may be “worth \$300 per hectare to the forest colonist but several times this to the world at large” (*The Economic Value of Biodiversity*, IUCN, 1994).

The principles of the Convention on Biological Diversity are that conservation of a natural forest will involve sustainable use of forest 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 the 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 customary, governmental or commercial channels.

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, including reserves for bad times, to ensure that the forest will be conserved. In this respect, economic valuation can be used a tool to ensure the financial sustainability of the forest.

But what if a natural forest appears to have an insufficient customer base? Or 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 managers will have to focus their efforts on marketing conservation as a business and the goods and services it has to offer.

From the perspective of global environmental agreements, however, it is highly unlikely that the customer base will be insufficient. Nevertheless, global customers may not be in a position to pay for the benefits they receive in a manner which will provide the appropriate incentives for the managers of the forest, as well as to those who desire to clear the forest, to conserve it. Thus valuation studies can also be used as a marketing tool to help raise additional revenues. Further, they can also be used as a policy tool to encourage institutional reform which will enable the forest managers to generate sufficient revenues from its broad customer base to make this forest financially sustainable.

Using valuation as a policy tool to encourage the design of measures which will provide incentives for the conservation of the forest leads us to consideration of incentive measures. Article 11 of the Convention on Biological Diversity calls on governments to develop economically and socially sound incentive measures for biodiversity. This topic will be addressed in a second article in this series.

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