

## **THE ECONOMIC VALUE OF TROPICAL FORESTS**

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Awareness of the monetary value of tropical forests has grown considerably over recent years. However, in many cases high forest value, often based on significant global benefits, is meaningless to decision makers.

The need to understand the values that reside in tropical forests arises from the fact that the area of tropical forest, and hence biodiversity and important forest functions, is declining annually. Economic valuation seeks to place monetary values on the complex array of goods and services provided by forests. The information derived through economic valuation has many potential uses including raising awareness, determining damages for loss of forests in liability regimes, revising national economic accounts to reflect the values of forest goods and services, and facilitating land use decisions. This information, in conjunction with studies of other important values such as cultural and spiritual values, can greatly assist in determining the socially optimal and equitable uses of forest land.

In the context of land use, it is unlikely that forest land will be set aside for conservation or sustainably managed unless such land use options are shown to compare favourably financially with alternative commercial uses for forest land such as timber harvesting, tea production, cattle ranching or tree plantations. This fact raises the question – can sustainable management and conservation of tropical forests compete economically with alternative commercial activities?

### **1. FOREST ECONOMIC VALUES**

Pearce & Pearce (2001) review and summarise existing empirical studies on forest economic values (see Table 1). As Pearce & Pearce stress, forest values are of course site specific and so the figures in this Table 1 should *not* be taken as representative of all forest areas. For example, tourism values are not relevant for remote and inaccessible forests, but carbon values would be. Non timber forest products (NTFPs) may be significant for a localised area but not for the forest site in general. Also, the values cannot simply be added since some uses are competitive. Nonetheless, these estimates do give us an idea of the range of values associated with each forest component and suggest some broad conclusions.

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Table 1 Summary of forest economic values. Units: \$ ha<sup>-1</sup> yr<sup>-1</sup> unless otherwise stated.

Forest good or service	Tropical forests
Timber	
Conventional logging	200-4400 (NPV)
Sustainable logging	300-2660 (NPV)
Conventional logging	20- 440 <sup>1)</sup>
Sustainable logging	30- 266 <sup>1)</sup>
Fuelwood	40
NTFPs	0- 100
Genetic information <sup>2)</sup>	0-3000
Recreation	2- 470 (general) 750 (forests near towns) 1000 (unique forests)
Watershed benefits	15- 850
Climate benefits (carbon sequestration and storage)	360- 2200 (GPV) <sup>3)</sup>
Biodiversity, intrinsic value	?
Amenity	-
Non-use values	
Option values	n.a.
Existence values	2- 12 4400 (unique areas)

Source: Pearce & Pearce, 2001.

Notes: 1) Annuitised net present value (NPV) at 10% for illustration; 2) Bioprospecting values are hotly debated, see for example Simpson & Sedjo (1996); 3) Assumes that compensation for carbon is a one off payment in the initial period and hence is treated as a present value. It is a gross present value (GPV) since no costs are deducted.

## 1.2 Conclusions on forest economic values

- 1) The highest values are associated with carbon storage and timber production. However, these two values are not additive since ultimately, logging results in carbon emissions. Carbon storage is then of the utmost importance to the economic case for conservation.
- 2) Conventional (non-sustainable) logging is more profitable than sustainable timber management. This means that the non-timber benefits from sustainable forests must exceed the general loss of profit relative to conventional logging for the market to favour sustainable forestry. While the economic value of NTFPs is low in comparison to the outputs of non-sustainable land use practices, it is important to bear in mind however, that the importance of NTFPs lies in the role they play in supporting local livelihoods.
- 3) Existence values and recreation values of forests are significant for specific areas and cannot be generalised. These values do not compete with those of carbon storage and timber production unless the forests have some unique features (either unique in themselves or as habitat for unique species), or are located near to towns. Unique forests usually have high non-use values, in contrast to the very modest non-use values for forests in general. Forests close to towns have high values due to recreational and tourism demand and familiarity of the forest to people, possibly in combination with the use of NTFPs and fuelwood.
- 4) Valuation methods almost certainly fail to capture the economic value of biodiversity. This is due to the difficulty of estimating the 'intrinsic' value of biodiversity. Therefore, only the value of genetic information is included in the analysis.

## **2. MISSING MARKETS AND MARKET DEVELOPMENT**

Clearly in certain cases, sustainable management of forest areas could be economically viable. Why then are (high value) forests continuously being depleted? The underlying causes of deforestation and forest degradation are many, including missing markets for non-market forest values, high discount rates, lack of secure property rights, adverse government policies, population pressure, corruption, and indebtedness. Crucially, in many cases there are economic incentives to engage in deforestation or forest damaging activities. Creating economic incentives for sustainable forest management should thus go a long way towards addressing destructive forest practices<sup>2</sup>.

High conservation values (e.g., for carbon storage) demonstrated through a valuation exercise are likely to mean little to decision makers if they are, in effect, just 'paper' values. Without markets and mechanisms to capture these values, (poor) countries are effectively faced with the dilemma of financing the conservation option, or securing a financial return from an alternative commercial land use. There is obviously more chance that conservation will occur in case there is an associated real cash flow benefit. Therefore, where sustainable land use does not pay in commercial terms, ways of converting non-commercial value to cash flows to stakeholders need to be found, in order to compensate them for forgoing non-sustainable use of forest resources. Potential approaches for translating benefits to cash flows to forest owners are summarised in Table 2.

Much can be achieved at the domestic level, however in cases where a high proportion of the total value of a forest represents global values (e.g., carbon storage benefits, value of genetic information for pharmaceuticals, nature tourism and existence value), international mechanism and agreements are required. Global values might be captured through global conventions, transfer mechanism, or internationally tradable emission permits.

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<sup>2</sup> Very few valuation studies have systematically investigated the incentive systems faced by resource users that explain much of the mismanagement of natural resources.

Table 2 Potential cash flows to a hypothetical forest owner

Good or service	Initial beneficiary	Form of cash flow
Timber	Concessionaire	Taxes
Fuelwood	Local communities or urban centres	Usually none
NTFPs	Local communities	Usually none or local sales
Genetic information for pharmaceuticals / agriculture	Plant breeders	Intellectual property rights fees, bioprospecting fees or royalties
Tourism/ Recreation	Drug companies	Markets exist, but countries often fail to capture sizeable value due to underpricing and leakage
Watershed benefits	Visitors	Usually none, potential for fees (e.g. Costa Rica)
Climate benefits	Tourism companies	Joint implementation, Clean Development Mechanism, tradable carbon permit system, spontaneous trades
Biodiversity (other than genetics)	Regional inhabitants	Debt for nature swaps, donations
Amenity	Global community	None: capitalised in land and property prices
Non-use values	Local and global communities	Environmental funds, debt for nature swaps, GEF, donations
	Local residents	
	Local, national and global communities	

Source: Based on Pearce & Pearce, 2001.

### 3. CONCLUSIONS

In order for conservation of forest areas to be economically feasible, such forest areas need to secure a financial return in excess of alternative uses. However, the emerging consensus is that sustainable use and conservation of forest land have considerable difficulty competing with alternative commercial uses such as conventional logging, agri-business and agriculture. Unique forest areas of high value are of course exceptions to this rule, but still the value of such sites is likely to be based on the kinds of value that *could* materialise if markets were created. Given the difficulties of competing with alternative commercial uses, the possibility of cashing in on the other benefits of forests appears to be essential. This involves the development of capture mechanisms that are able to effectively finance conservation. Given the current knowledge of forest values, it appears that emphasis in this respect would be best placed on carbon storage and sequestration and, where relevant, tourism and the sale of samples for bioprospecting. Mechanism for appropriating global values are highly important- global values often represent a significant proportion of total economic value. However, developing countries presently face significant problems appropriating these benefits.

### 4. REFERENCES

- Pearce, D.W. and Pearce, C.G. (2001). *The value of forest ecosystems*. Report to the Secretariat of the United Nations Convention on Biological Diversity. Montreal, Canada.
- Simpson, R.D. and Sedjo, R.A. (1996). *Valuation of biodiversity for use in new product research in a model of sequential search*. RFF Discussion Paper 26-27. Resources for the Future, Washington