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# ECONOMIC MEASURES FOR BIODIVERSITY PLANNING: An Annotated Bibliography of Methods, Experiences and Cases

*Version 12/00*

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December 2000



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GLOBAL ENVIRONMENT FACILITY  
Biodiversity Planning Support Programme



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## Citation:

L. Emerton, *The Use of Economic Measures for Biodiversity Planning: An Annotated Bibliography of Methods, Experiences and Cases*. IUCN — The World Conservation Union, Eastern Africa Regional Office, Nairobi

## Acknowledgement:

This publication was produced for the UNDP-UNEP-GEF Biodiversity Planning Support Programme, as part of the sub-project Use of Economic Incentives in National Biodiversity Strategies and Action Plans (GF/1200-99-70). It was co-funded under the general agreement regarding co-operation on biodiversity conservation and sustainable development between the IUCN – The World Conservation Union and the Swiss Agency for Development and Co-operation (SDC), as part of the project “Supporting Global Action to Conserve Biodiversity and Sustainably Use Biological Resources: Phase III”. The document was produced under IUCN’s Biodiversity Economics for Eastern Africa Programme.

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# 1 INTRODUCTION

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The aim of this document is to review literature on economic measures for biodiversity planning, so as to highlight available economic methods and to document examples of their application to biodiversity. The main focus of the review is on economic valuation and economic incentives. Financial mechanisms for biodiversity conservation form the focus of a separate thematic study, so are not considered in detail here.

Economic concerns are of central importance to biodiversity conservation. Economic forces underlie and explain biodiversity degradation and loss, and economic measures provide a useful set of tools for strengthening biodiversity conservation, sustainable use and equitable benefit sharing.

If biodiversity policies, strategies and plans are to be effective they must be justifiable in economic terms. They also need to make efforts both to overcome the economic causes of biodiversity loss and to ensure that economic incentives are set in place which encourage biodiversity conservation. Equally, the goals and strategies they attempt to attain and use have to be acceptable to (and understood by) other “economic” sectors, decision-makers and planners, if they are to integrate biodiversity concerns into their own strategies, policies and plans.

Documenting experiences and lessons learned in the use of economic measures in biodiversity policies, strategies and plans, and providing guidance on best practices and methods for this, can thus make an important contribution to biodiversity conservation planning and management practice.

The review is focused on published literature on biodiversity economics which can easily be accessed. Although there is a large amount of unpublished “grey material” dealing with economic measures for biodiversity planning (such as project documents, mission reports, notes from verbal presentations, and so on), this material is not widely available, and often has limited access and distribution. All of the literature referred to in this document can be obtained easily from published books and journals, from the internet, or from the organisations who have produced it.

**Section 2: Annotated bibliography of the literature**, presents the references in alphabetical order. Full details of the author, title, publication details and ISBN number are given for each. Indications of the regional and country coverage of the publication, its focus on key ecosystems or sectors, and the main topics it deals with are also summarised.

**Section 3: Indexes**, presents indexes of the literature by region, country, ecosystem or sector and topic.

This bibliography is not exhaustive, and should be seen as a document in process. The economics of biodiversity is a relatively recent, and dynamic, subject matter. New materials are constantly being added to the existing body of literature. This bibliography is therefore presented in a form that can, and will, be updated periodically, as new literature becomes available or as additional references are found and incorporated.

## 2 ANNOTATED BIBLIOGRAPHY OF THE LITERATURE

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**#1.** Abala, D. O. (1987). 'A theoretical and empirical investigation of the willingness to pay for recreational services: a case study of Nairobi National Park', *Eastern Africa Economic Review* 3 (2):111-119

This paper examines the factors that influence willingness to pay for park services. Econometric methods are applied to data from 333 Nairobi National Park users. The study shows that factors that may help to explain people's willingness to pay for the park services fall into two categories: the socio-economic characteristics of park users, and the physical attributes of the park itself. However it is probable that non-economic factors also play an important role in the determination of park users' willingness to pay for park services. An interesting result of the study is that human congestion in the park has a significant negative impact on the users' willingness to pay for park services. The study further indicates that animals per se do not seem to be significant in determining the users' willingness to pay for park services. It is also clear that the current gate charges should be raised to reflect the users' willingness to pay for park services, since this will not affect the visitation rates to the park.

**Coverage:** Africa

**Contains examples or case studies from:** Kenya

**Ecosystem or sector focus:** Wildlife, Protected Areas, Tourism

**Topics:** Valuation, Travel cost

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**#2.** Acharya, G., (1998), *Capturing the Hidden Values of Wetland Ecosystems as a Mechanism for Financing the Wise Use of Wetlands*. Paper presented at workshop on Mechanisms for Financing Wise Use of Wetlands, Second International Conference on Wetlands Development and Conservation, Dakar, Senegal 13 November 1998. 15 pp. <http://www.biodiversityeconomics.org>

This paper focuses on the use of economic valuation as an incentive for wetland conservation. The environment's services are valuable but these values are a) seldom recognised and quantified and b) are often lost through

inappropriate development or used inefficiently. Linkages between use values and ecosystem functions will be stressed in this discussion. The paper emphasises that appropriate incentives can only be developed once the values derived from these ecosystems are recognised. The role of the public and private sectors in initiating valuation studies is discussed.

**Coverage:** Global

**Ecosystem or sector focus:** Wetlands, Water

**Topics:** Financial mechanisms, Economic instruments, Incentive measures, Valuation, Convention on Biological Diversity, Ramsar Convention

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**#3.** Adamowicz, W., & Beckley, T. (1998). 'In search of forest resource values of indigenous peoples: are non-market valuation techniques applicable?', *Society and Natural Resources* (11):51-66

This article examines issues surrounding the potential applicability of non-market valuation techniques to indigenous peoples. A conceptual model examines relationships between natural and conceptual environments and value systems. Problems of valuation identified include eliciting values for individuals, aggregating individual values into measures of social welfare, and comparisons of welfare across culturally different groups. The influence of sacred or taboo goods, the potential for satiation, and variations in property rights are factors to address in assessing individual values. Differences in political and property rights systems, and unique demographic structures are seen as limits to aggregating values for randomly selected individuals. Since valuation is endogenous to specific social environments, aggregations of indigenous and non-indigenous measures of social welfare may be inappropriate.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Valuation

**#4.** Adger, W. N., Brown, K., Cervigni, R., & Moran, D. (1995). 'Total Economic Value of Forests in Mexico', *Ambio* 24 (5):286-296

Failure to account for the numerous functions and economic uses of forests have led to patterns of global forest use with many detrimental environmental consequences. This study demonstrates the economic techniques for estimating the total economic value of forests and applies it to Mexico's forest estate. However, only a proportion of this economic value can feasibly be "captured" within Mexico: much of the benefit of Mexico's forests falls outside the country's borders, and is therefore not considered by forest users or national policymakers.

**Coverage:** Latin America

**Contains examples or case studies from:** Mexico

**Ecosystem or sector focus:** Forests

**Topics:** Valuation, Economic policies, Market valuation, Climate change, Effect on production

**#5.** Adger, W. N., & Grohs, F. (1994).

'Aggregate estimate of environmental degradation for Zimbabwe: does sustainable national income ensure sustainability?', *Ecological Economics* 11:93-104

Standard measures of economic growth do not adequately reflect changes in aggregate welfare over time. Sustainable national income is therefore defined a Net National Product with adjustments for the degradation of renewable and non-renewable capital. Productivity loss rather than replacement cost is the most theoretically correct way to value resource depletion. Modified net national product is estimated for the agriculture and forestry sectors in Zimbabwe by valuing the loss of forest stock and soil erosion. The results show that traditional measures overstate the value of the agricultural sector's output by approximately 10%. It is argued that indicators of sustainable national income do not ensure sustainable development, nor do they point to mechanisms that would ensure sustainable natural resource management.

**Coverage:** Africa

**Contains examples or case studies from:** Zimbabwe

**Ecosystem or sector focus:** Forests, Agriculture, Industry

**Topics:** Environmental accounting, Valuation, Soil erosion, Economic policies

**#6.** Adhikari, A. P., Bhandari, B., & Pyakuryal, B. (Eds.), (1998), *Environmental Economics in Nepal*. Proceedings of the Workshop on Environmental Economics: Kathmandu, Nepal. 101 pp. ISBN 92-9144-028-0

This document reports on two workshops carried out in Nepal on environmental economics and on green accounting. It includes the papers presented at these workshops, their deliberations and conclusions reached.

**Coverage:** Asia

**Contains examples or case studies from:** Nepal

**Topics:** Environmental accounting, Valuation, Economic instruments

**#7.** Allaway, J., & Cox, P. (1989). 'Forests and competing land uses in Kenya', *Environmental Management* 13 (2):171-187

Indigenous forests in Kenya are under heavy pressure from competing agricultural land uses and from unsustainable cutting. The problem is compounded by high population growth rates and an agriculturally based economy. The economic and ecological consequences of these pressures need to be considered in land use decision making. A method for combining ecological and economic considerations and for the analysis of forest land-use issues is illustrated using the Kenyan situation. The status of principal forest areas in Kenya is summarised and competing land uses are compared on the basis of ecological functions and economic analysis. Replacement uses did not match the ecological functions of forests, although established stands of tree crops could have roughly comparable effects on soil and water resources. Indigenous forests had economic benefits from tourism and protection of downstream agricultural productivity. Economic returns from competing land uses were very varied, with tea having the highest returns and fuelwood plantations having returns comparable to some annual crops and dairy farming. Combined consideration of economic and ecological factors suggested some trade-offs for improving land allocation decisions and

several management opportunities for increasing benefits or reducing costs from particular land uses. A general strategy is proposed for forest land management in Kenya.

**Coverage:** Africa

**Contains examples or case studies from:** Kenya

**Ecosystem or sector focus:** Forests, Agriculture

**Topics:** Valuation

Causes of biodiversity loss, Economic instruments

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**#8.** Anderson, T., (1996), *Enviro-Capitalists: Why and How to Preserve Their Habitat*.

Paper presented at IUCN Workshop on Economics of Biodiversity Loss, April 1996, Gland, Switzerland. 33 pp.

<http://www.biodiversityeconomics.org>

This paper asks the following question: to what extent should the private sector be left alone to manage biodiversity? The answer presented is that all too often political intervention in the market place either eliminates incentives for entrepreneurs to manage natural resources in a sustainable way or generates other incentives that lead to their actual destruction. Examples of each scenario are given and the demonstration is made that there are cases in which the individual entrepreneur alone has access to the time-specific and place-specific information required for sound biodiversity management. The special contribution of this paper in the context of the Workshop on the Economics of Biodiversity Loss is to show in concrete terms the way in which governmental intervention can be detrimental to biodiversity conservation and the consequent value of market approaches in this respect. This means that in designing a biodiversity impact assessment framework the effects of market processes and of governmental regulations must be taken into account.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Topics:** Private sector, Economic instruments, Financial mechanisms, Incentive measures, Causes of biodiversity loss

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**#9.** Andersson, J. E. C., & Ngazi, Z. (1995).

'Marine resource use and the establishment of a marine park: Mafia Island, Tanzania', *Ambio* 24 (7-8):475-481

This article quantifies the local economic opportunity costs and benefits of setting up a marine protected area. It looks at the market value of fisheries activities foregone by local communities. The study demonstrates that local involvement can be of great value in finding sustainable viable solutions with regard to issues such as economic incentives, alternatives to destructive activities, education and compensation. In addition it was found that compensation can be a cost efficient and sustainable means of enforcing regulations, but on the condition that it is appropriate and that it stems from the direct involvement of indigenous resource users.

**Coverage:** Africa

**Contains examples or case studies from:** Tanzania

**Ecosystem or sector focus:** Marine and coastal, Fisheries, Protected Areas

**Topics:** Valuation

Incentive measures

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**#10.** Angelsen, A., & Kaimowitz, D. (1999).

'Rethinking the Causes of Deforestation: Lessons from Economic Models', *The World Bank Research Observer*, 14 (1):73-98

This article, which synthesises the results of more than 140 economic models analysing the causes of tropical deforestation, raises significant doubts about many conventional hypotheses in the debate about deforestation. More roads, higher agricultural prices, lower wages, and a shortage of off-farm employment generally lead to more deforestation. How technical change, agricultural input prices, household income levels, and tenure security affect deforestation — if at all — is unknown. The role of macroeconomic factors such as population growth, poverty reduction, national income, economic growth, and foreign debt is also ambiguous. This review, however, finds that policy reforms included in current economic liberalisation and adjustment efforts may increase the pressure on forests. Although the boom in deforestation modelling has yielded new insights, weak methodology and poor-quality



data make the results of many models questionable.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Incentive measures, Economic instruments, Economic policies, Causes of biodiversity loss

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**#11.** Aylward, B., (1991), *The Economic Value of Ecosystems: 3 - Biological Diversity*. Gatekeeper Series GK 91-03, London Environmental Economics Centre: London. 10 pp.

This paper looks at the valuation of biodiversity. It argues that biodiversity loss is caused in part by the market, price and policy failures that under-value biodiversity. The paper attempts to clarify the ecological and economic rationale behind drawing a distinction between the values of biodiversity and biological resources. It concludes by proposing an alternative conceptual approach and methodological basis for attaching economic value to biodiversity.

**Coverage:** Global

**Topics:** Valuation, Causes of biodiversity loss

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**#12.** Aylward, B., & Barbier, E. B., (1992), *What is Biodiversity Worth to a Developing Country? Capturing the Pharmaceutical Value of Species Information*. LEEC Paper DP 92-05, London Environmental Economics Centre: London. 17 pp.

There has been a resurgence of interest in the use of biodiversity as a source of novel chemical compounds for the development of new pharmaceuticals. Both commercial companies and developing-country governments are increasingly starting to capture the "pharmaceutical value" of biodiversity. There are however some potential misunderstandings in the view that pharmaceutical prospecting can serve as a mechanism for developing countries to extract compensation for the conservation of their biodiversity. This paper addresses this question, and looks at the economic relationships involved in pharmaceutical prospecting. It argues that an over-emphasis on the question of how to capture the value of biodiversity misses the key question: that of how to invest in the generation of

information about biodiversity. It suggests that in order to capture the pharmaceutical value of biodiversity, developing countries would need to come up with a practical mechanism for controlling access to their biodiversity. They could then move beyond deriving a fair share of the returns from raw materials to information generating activities that add value to the resource itself.

**Coverage:** Global

**Topics:** Bioprospecting, Trade, Incentive measures, Financial mechanisms, Valuation, Economic instruments, Markets and charges

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**#13.** Aylward, B., Echeverria, J., & Barbier, E. B., (1995), *Economic Incentives for Watershed Protection: A Report on an On-going Study of Arenal, Costa Rica*. CREED Working Paper Series No 3, International Institute for Environment and Development: London. 22 pp.

Tropical moist forests provide a range of goods and services. Traditionally, land use decisions have been made on the basis of only the direct use of forest land and resources to generate local and national benefits. In recent years increasing attention has however been given to the important economic role that non-market benefits play in providing incentives for tropical forest conservation. This study explores the economic role that forests play in providing watershed protection. Drawing on the literature and on-going research in the Arenal regional of Costa Rica, this paper outlines a collaborative research project investigating the potential for economic incentives for watershed protection.

**Coverage:** Latin America

**Contains examples or case studies from:** Costa Rica

**Ecosystem or sector focus:** Forests, Water, Watersheds

**Topics:** Economic instruments, Incentive measures, Valuation, Economic policies, Payments for environmental services

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**#14.** Bann, C., (1997), *The Economic Valuation of Mangroves: A Manual for*

**Researchers.** International Development Research Centre: Ottawa. 51 pp.

This manual on the economic valuation of mangroves has been developed to aid researchers in South East Asia involved in the evaluation of mangrove ecosystems. Its main components are an introduction to the values to mangroves and threats to them, a theoretical introduction to environmental valuation, a methodology for the economic assessment of mangrove management options, a qualitative discussion of the possible impacts associated with common development options for mangrove ecosystems, and two case study examples from Asia.

**Coverage:** Global, Asia

**Contains examples or case studies from:** Cambodia, Indonesia, Vietnam

**Ecosystem or sector focus:** Marine and coastal, Wetlands, Fisheries, Forests

**Topics:** Valuation

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**#15.** Barbier, E., & Conroy, C. (1989). 'Setting the right economic environment for sub-Saharan Africa', *Appropriate Technology* 16 (2):20-22  
Suggests that if the lessons of environmental economics were applied to the problems of sub-Saharan Africa, there would be greater incentives to preserve and enhance natural resources. Looks briefly at: an economic evaluation of the costs and benefits of resource use and degradation at a project-specific or economy-wide level; and the design of incentive packages to improve resource management.

**Coverage:** Africa

**Topics:** Incentive measures, Valuation, Causes of biodiversity loss, Economic instruments

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**#16.** Barbier, E. B., (1989), *Economics, Natural Resource Scarcity and Development: Conventional and Alternative Views*. Earthscan Publications Ltd: London. 223 pp. ISBN 1-85383-024-0

This book proposes a new economic approach to the use of natural resources and particularly to the problem of environmental degradation. It reviews and criticises traditional approaches to resource economics and instead outlines an alternative view of environmental economics and natural

resource scarcity. Examples are given of the application of these economics approaches to environmental problems in Brazil and Indonesia.

**Coverage:** Global, Asia, Latin America

**Contains examples or case studies from:** Brazil, Indonesia

**Ecosystem or sector focus:** Forests, Watersheds

**Topics:** Pollution, Valuation, Economic instruments

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**#17.** Barbier, E. B., (1991), *The Economic Value of Tropical Ecosystems: 2 - Tropical Forests*. Gatekeeper Series 91-01, London Environmental Economics Centre, London. 10 pp.

This paper presents a broad overview of the different components of the total economic value of tropical forest ecosystems. It looks at methods for the cost-benefit analysis of comparing the economic values associated with forest preservation, conversion and sustainable management, and gives an example from Korup National Park, Cameroon. The paper concludes that calculating the different components of the total economic value of forests is essential for applying cost-benefit analysis to different forest land use options.

**Coverage:** Africa, Global

**Contains examples or case studies from:** Cameroon

**Ecosystem or sector focus:** Forests

**Topics:** Valuation, Deforestation

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**#18.** Barbier, E. B. (1994). 'Valuing environmental functions: tropical wetlands', *Land Economics* 70 (2):155-173

Recent studies have suggested that tropical wetlands may have a crucial economic role to play in development. This paper provides an overview of these benefits, using a general framework of cost-benefit analysis as the methodological approach to assessing wetland values. An analysis of the trade-offs between conserving or converting tropical wetlands demonstrates that taking into account the opportunity costs of wetland loss leads to a lower level of conversion

than would otherwise be the case. Finally, the paper discusses the extensions and limitations of the production function approach as applied to valuing non-marketed wetland benefits.

**Coverage:** Global

**Ecosystem or sector focus:** Wetlands, Water

**Topics:** Valuation

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**#19.** Barbier, E. B., Acreman, M., & Knowler, D., (1997), *Economic Valuation of Wetlands: A Guide for Policy Makers and Planners*. Ramsar Convention Bureau: Gland. 127 pp. ISBN 2-940073-21-X

Many planning and development decisions are made on economic grounds. While this paradigm has its limitations, it is unrealistic to ignore it. Hence wetland goods and services must be given a quantitative value if their conservation is to be chosen over alternative uses of the land itself or the water that feeds the wetlands. This book sets out to provide guidance to policy makers and planners on what the potential is for economic valuation of wetlands and how valuation studies can be undertaken. A basic overview of different valuation methods is given, illustrated with case studies from around the world, guidance on planning a study and model terms of reference for technical consultants are also provided.

**Coverage:** Global, Europe, North America, Asia, Africa

**Contains examples or case studies from:** Nigeria, USA, UK, Sweden, Indonesia

**Ecosystem or sector focus:** Wetlands, Water

**Topics:** Valuation, Market valuation, Effect on production, Contingent valuation, Travel cost, Mitigative and averted expenditures, Ramsar Convention

**Other:** Also published in Spanish and French.

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**#20.** Barbier, E. B., Bockstael, N., Burgess, J. C., & Strand, I., (1993), *The Timber Trade and Tropical Deforestation in Indonesia*. LEEC Paper DP 93-01, London Environmental Economics Centre: London. 17 pp.

This paper examines the links between the trade in tropical timber products and deforestation in

Indonesia. It briefly reviews evidence suggesting that timber production is a factor in tropical deforestation, and examines the role of timber trade policy in Indonesia in influencing this process by affecting forest-based industrialisation. A partial equilibrium timber trade model of Indonesia is developed in order to analyse the effects of various policy interventions on trade and tropical deforestation. The paper concludes by summarising the results of the policy analysis and discussed policy options open to the government and importing countries.

**Coverage:** Asia

**Contains examples or case studies from:** Indonesia

**Ecosystem or sector focus:** Forests

**Topics:** Trade, Causes of biodiversity loss, Incentive measures, Economic policies

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**#21.** Barbier, E. B., Burgess, J. C., & Folke, C., (1994), *Paradise Lost? The Ecological Economics of Biodiversity*. Earthscan Publications Ltd: London. 267 pp. ISBN 1-85383-181-6

This book shows how an interdisciplinary approach can understand and tackle issues relating to biodiversity conservation. It provides an overview of the causes of biodiversity loss and of previous approaches to dealing with them, and examines the effects of biodiversity loss on specific natural systems. It then looks at the policy implications of what we know, discussing the ecological limits to economic activity and the management institutions needed to make an integrated approach effective. Conclusions are presented on the future research needed and policy challenges that have to be confronted.

**Coverage:** Global, Latin America, Caribbean, Africa, Asia

**Contains examples or case studies from:** Madagascar, Nigeria, Sweden, India, Australia, Korea, Kenya, Cyprus, Indonesia, Botswana

**Ecosystem or sector focus:** Forests, Fisheries, Wetlands, Marine and coastal, Drylands

**Topics:** Valuation, Economic instruments, Economic policies, Incentive measures, Disincentives, Causes of biodiversity loss



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**#22.** Barbier, E. B., Burgess, J. C., Swanson, T., & Pearce, D., (1990), *Elephants, Economics and Ivory*. Earthscan Publishers Ltd: London.

The dramatic decline in elephants numbers in most of Africa has been largely attributed to the illegal harvesting of ivory. The decision to ban all trade in ivory is intended to save the elephant. This book examines the ivory trade, its regulation and its implications for elephant management from an economic perspective. It argues that there should be a very limited trade in ivory, designed to maintain the incentive for sustainable development in southern African countries and to encourage other countries to follow suit.

**Coverage:** Africa

**Ecosystem or sector focus:** Protected Areas, Drylands, Forests, Wildlife

**Topics:** Trade, Causes of biodiversity loss, Incentive measures, Financial mechanisms, International Conventions, Convention on International Trade in Endangered Species

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**#23.** Barret, S., (1989), *Deforestation, Biological Conservation and the Optimal Provision of Wildlife Reserves*. LEEC Paper DP 89-06, London Environmental Economics Centre: London. 36 pp.

This paper uses the species-area relation to characterise the optimal deforestation program and to determine the optimal provision of wildlife reserves for tropical rain forest countries. These decisions, it is shown, must be taken jointly. The model constructed in this paper is more general than those used previously for analysis of the economics of environmental preservation. Provided a very simple inequality is satisfied, it will be optimal to set aside a greater quantity of wildlife reserves and to choose a slower rate of deforestation, even if the marginal returns to deforestation increase over time. Implications for policy are also discussed.

**Coverage:** Global

**Ecosystem or sector focus:** Forests, Wildlife, Protected Areas

**Topics:** Causes of biodiversity loss, Valuation, Incentive measures, Economic policies

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**#24.** Bartelmus, P., Lutz, E., & Shweinfest, S., (1992), *Integrated Environmental and Economic Accounting: A Case Study for Papua New Guinea*. Environment Working Paper 54, Environment Department, World Bank: Washington DC. 57 pp.

This document presents a case study of the application of environmental accounting to Papua New Guinea using the integrated environmental and economic accounting framework developed by the United Nations Statistical Office. Environmental expenditures by government are low. Depreciation of produced assets was calculated at between 9-11% of GDP resulting in a NDP of between 89-91% of GDP. Environmental impacts in the agriculture, forestry, energy and mining sectors amounted to an average of 2.1% of NDP over the period 1986-90. The resulting environmentally adjusted NDP was estimated to range from 90-97% of NDP.

**Coverage:** Pacific

**Contains examples or case studies from:** Papua New Guinea

**Ecosystem or sector focus:** Agriculture, Forests, Industry

**Topics:** Environmental accounting, Valuation

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**#25.** Bartelmus, P., & van Tongeren, J., (1994), *Environmental Accounting: An Operational Perspective*. Department for Economic and Social Information and Policy Analysis, Working Paper No 1, United Nations: New York. 25 pp.

Economic growth has been overemphasised in the past. As a consequence distributional and environmental aspects have been neglected. Sustainable development aims to incorporate these dimensions in comprehensive broad-based development planning. Integrated environmental and economic accounting focuses on a number of the more obvious deficiencies of conventional national accounts with regard to the environment. This paper summarises practical recommendations on integrated environmental and economic accounting and presents an overview of the methodologies involved.

**Coverage:** Global

**Topics:** Environmental accounting, Valuation

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**#26.** Bayon, R., & Deere, C., (1998), *Financing Biodiversity Conservation: The Potential of Environmental Funds*. Paper presented at a workshop on Financial Innovations for Biodiversity, 10th Global Biodiversity Forum, Bratislava, Slovakia, 1-3 May 1998. 30 pp.  
<http://www.biodiversityeconomics.org>

In the 1990s, Environmental Funds (EFs) have emerged as promising long-term mechanisms for providing financial support to biodiversity conservation and sustainable development activities. Environmental Funds, however, vary widely depending on the source, management and distribution of their funds. This paper responds to frequently asked questions about the operation and performance of Environmental Funds. It provides several case studies to highlight why they are attractive mechanisms for funding biodiversity protection and seeks to draw some of the many lessons that have been learned as Environmental Funds have matured and gained experience at managing assets and grant programs (particularly in Latin America). Finally, the paper offers several recommendations for the Fourth Conference of the Parties to the Biodiversity Convention. In particular, it advises that Environmental Funds are a good way to finance biodiversity conservation and for the Global Environment Facility (GEF) to leverage its funds. It recommends that the GEF be called upon to explore Environmental Funds as preferred financial mechanisms for investment in biodiversity projects. Environmental Funds vary greatly in terms of their funding, governance, structure, purpose and funding priorities. They operate at the local, national and sometimes, regional level. Yet, there are some common threads, both in terms of lessons learned and features contributing to success. For instance, the most successful funds tend to operate like independent foundations, investing their assets and using the interest to fund programs. They tend to be governed by mixed public-private sector boards, often with NGOs often as "majority stakeholders", helping manage the capital, invest the funds, and determine which projects will receive funding. This paper looks at issues involved in Environmental Funds, and makes a number of recommendations to the CBD.

**Coverage:** Global

**Topics:** Financial mechanisms, Convention on Biological Diversity, Trust Funds, Debt conversion

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**#27.** Bayon, R., Deere, C., Norris, R., & Smith, S. E., (1999), *Environmental Funds Lessons Learned and Future Prospects*. IUCN - The World Conservation Union. 26 pp.  
<http://www.biodiversityeconomics.org>

Environmental organisations have long realised that sustainable finance is a pre-requisite for sustainable development. One mechanism advocated as a means of achieving sustainable finance is the "Environmental Fund" (EF) (also known as conservation trust fund, and national environment fund). Over the past ten years, a number of EFs have been created in developing countries by national governments, conservation organisations and donors. They vary widely depending on local actors and circumstances. Their record has been mixed: although some have been extremely effective at beginning to accomplish the goals they have set, others have not. While EFs have some impressive accomplishments, their long term success and impact on conservation and sustainable development remain difficult to ascertain. In 1998, the Global Environment Facility (GEF), an important contributor to EFs world-wide, carried out an evaluation of experience with Environmental Funds. This article draws on the GEF study and over five years experience with EFs to review the lessons learned. It describes how EFs are structured and the kinds of activities they have supported. It examines the key conditions that influence their success or failure. It discusses factors that should be taken into consideration when deciding whether EFs may be an appropriate mechanism for supporting conservation activities in a particular setting. Finally, the article looks to the future and outlines important trends that are likely to affect the financing and future development of EFs.

**Coverage:** Global

**Topics:** Trust Funds, Financial mechanisms, Debt conversion

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**#28.** Berg, H., Ohman, M. C., Troeng, S., & Linden, O. (1998). 'Environmental economics of coral reef destruction in Sri Lanka', *Ambio* 27 (8):627-634

Coral reefs are a resource of immense importance for a large number of people, especially coastal populations in the developing world. Available information on coral reefs in Sri Lanka and South East Asia has been used to evaluate the ecological services provided by coral reefs and to assess the long-term economic benefits derived from some of the ecosystem functions. The minimum estimate of economic value of coral reefs in Sri Lanka is US\$ 140,000-US\$ 750,000 per square kilometre over a 20 year period. The economic consequences of coral mining were also investigated and economic costs (US\$ 110,000-7,360,000) were found to exceed net benefits (US\$ 750,000-1,670,000) when analysed over 20 years in tourism areas. The highest costs were associated with decreased tourism and increased erosion. However in rural areas there is still a strong incentive for coral mining, because it provides a more profitable business than fishing or agriculture in the short-term. The results have implications for management and show that Sri Lankan legislation banning coral mining in the coastal zone is beneficial to the country's economic development.

**Coverage:** Asia

**Contains examples or case studies from:** Sri Lanka

**Ecosystem or sector focus:** Marine and coastal, Fisheries, Tourism

**Topics:** Valuation, Contingent valuation, Effect on production, Mitigative and avertive expenditures, Replacement costs, Causes of biodiversity loss

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**#29.** Bishop, J., (1995), *The Economics of Soil Degradation: An Illustration to the Change in Productivity Approach to Valuation in Mali and Malawi*. LEEC Paper DP 95-02, London Environmental Economics Centre: London. 80 pp.

This paper looks at the economic costs of land degradation and soil erosion. It begins by reviewing basic concepts and techniques used in the economic analysis of soil degradation. The impacts of soil degradation on agriculture is discussed in terms of productivity, farmer response and technological change. A review of various economic techniques for the valuation and an overview of the various policy failures and market distortions that give rise to soil degradation are presented. Results from case

studies of the economic valuation of soil degradation in Mali and Malawi are presented.

**Coverage:** Africa

**Contains examples or case studies from:** Malawi, Mali

**Ecosystem or sector focus:** Agriculture, Forests

**Topics:** Soil erosion, Land degradation, Valuation, Incentive measures

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**#30.** Bishop, J., Aylward, B., & Barbier, E. B., (1991), *Guidelines for Applying Environmental Economics in Developing Countries*. LEEC Paper DP 91-02, London Environmental Economics Centre: London. 14 pp.

These guidelines are intended to support the use of economic analysis in assessing environmental problems in developing countries. They have been written for an audience familiar with the language of economics as a practical introduction to applied environmental economics. The first section deals with the assessment of natural resource endowments, trends and potential problems, with a focus on defining economy-environment links and the valuation of environmental degradation. The second section reviews the market failures underlying many environmental problems including causes, consequences and alternative policy responses. The final section reviews the impact of public policy on the environment including the effects of regulation, economic policy, public investment and institutions.

**Coverage:** Global

**Topics:** Environmental accounting, Causes of biodiversity loss, Economic policies, Economic instruments, Incentive measures, Disincentives, Valuation

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**#31.** Blockhus, J., Bagri, A., & Vorhies, F., (1999), *Perverse Subsidies and Biodiversity Loss*. IUCN - The World Conservation Union. 48 pp. <http://www.biodiversityeconomics.org>

This paper examines one aspect of the interaction between biodiversity, the economy and society – the impact of public subsidies on biodiversity. Subsidies are actually a type of incentive measure

designed to encourage certain behaviour. The CBD in Article 11 calls on governments to design economically and socially sound measures which provide incentives for conservation and sustainable use. Subsequent deliberations of the CBD Conference of the Parties have further emphasised the need to address perverse incentives. (See in particular COP decisions III/18 and IV/10a). Perverse incentives undermine conservation and sustainable use.

**Coverage:** Global

**Ecosystem or sector focus:** Drylands, Forests, Marine and coastal, Agriculture, Wetlands, Mountains, Industry, Infrastructure

**Topics:** Causes of biodiversity loss, Subsidies, Incentive measures, Disincentives, Convention on Biological Diversity

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**#32.** Bojo, J. (1991). 'Economics and land degradation', *Ambio* 20 (2):75-79

This article analyses the problem of land degradation from an economic viewpoint, with particular attention to the situation in developing countries. It also discusses how economic analysis can contribute to efficient land rehabilitation. A brief review of available evidence of land degradation, physical as well as economic assessments, is presented. The driving forces behind land degradation are discussed in terms of market failure and policy failure that contribute to land degradation or hamper effective counter measures. There is a brief discussion about attempts made to remedy the situation. In general, soil conservation appears to have been unsuccessful. New ideas are emerging that set a challenging agenda for the future. It is argued that economics can play a positive role at the project level and at the level of national and international planning in improving land management.

**Coverage:** Global

**Ecosystem or sector focus:** Forests, Agriculture

**Topics:** Valuation, Economic policies, Causes of biodiversity loss, Economic instruments, Soil erosion, Land degradation

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**#33.** Bojo, J., (1996), *The Economics of Wildlife: Case Studies from Ghana, Kenya, Namibia and Zimbabwe*. AFTES Working

Paper No 19, Environmental Policy and Planning, World Bank: Washington DC. 145 pp.

This report documents a study on wildlife economics in four African countries. It aims to provide experiences to help shape policy and project interventions. The report looks at wildlife policies and legislation, and attempts to assess the relative profitability of wildlife management.

**Coverage:** Africa

**Contains examples or case studies from:** Ghana, Kenya, Namibia, Zimbabwe

**Ecosystem or sector focus:** Wildlife, Protected Areas

**Topics:** Valuation, Economic policies, Causes of biodiversity loss, Incentive measures

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**#34.** Bostedt, G., & Mattsson, L. (1995). 'The value of forests for tourism in Sweden', *Annals of Tourism Research* 22 (3):671-680

Sweden has a vast quantity of forests, and the right of common access allows tourists to freely enter any forests no matter who owns it. An economic valuation study was carried out in two tourism areas, one in the southern part of the country and one in the northern part. It was shown that a considerable portion of the value to tourists can be attributed to forest characteristics. Furthermore the results show that this value can be increased by modifying forest management practices: for example by making clearcuts smaller, even if there were more of them, and by increasing the proportion of broad leafed trees in forest stands.

**Coverage:** Europe

**Contains examples or case studies from:** Sweden

**Ecosystem or sector focus:** Forests, Tourism

**Topics:** Valuation, Contingent valuation

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**#35.** Bowles, I. A., Clark, D., Downes, D., & Guerin-McManus, M., (1996), *Encouraging Private Sector Support for Biodiversity Conservation: The Use of Economic Incentives and Legal Tools*. Policy Papers Volume I 1996, Conservation International: Washington DC. 12 pp.



This report summarises some of the key approaches to designing economic incentives for private sector participation in biodiversity conservation. It introduces the reader to some of the fundamental reasons why business cannot ignore conservation. It also explores how economic incentives can often accomplish major conservation objectives at a lower cost than traditional approaches.

**Coverage:** Global

**Topics:** Incentive measures, Taxes, Financial mechanisms, Private sector

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**#36.** Boyd, J., Caballero, K., & Simpson, D. R., (1999), *The Law and Economics of Habitat Conservation: Lessons from an Analysis of Easement Acquisitions*. Discussion Paper 99-32, Resources for the Future: Washington DC. 45 pp.

There is a growing interest in incentive-based policies to motivate conservation by landowners. These policies include full- and partial-interest land purchases, tax-based incentives, and tradable or bankable development rights. Using legal and economic analysis, the paper explores potential pitfalls associated with the use of such policies. Incentive-based policies promise to improve the cost effectiveness of habitat preservation, but only if long-run implementation issues are meaningfully addressed. While we compare conservation policies, particular attention is devoted to the use of conservation easements and in particular a set of easement contracts and transactions in the state of Florida. The easement analysis highlights the importance of conservation policies' interactions with property markets, land management practices, and bureaucratic incentives. Specific challenges include difficulties associated with the long-term enforcement and monitoring of land use restrictions, the lack of market prices as indicators of value for appraisal, and the way in which incentives target specific properties for protection.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Topics:** Economic instruments, Taxes

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**#37.** Brown, G., & Henry, W., (1989), *The Economic Value of Elephants*. London Environmental Economics Centre: London.

This paper reports on a valuation study used to estimate the value of Kenya's elephants to tourists through a survey administered to visitors to major National Parks and lodges. It highlights the decline of African elephant populations in the last decades, mainly due to poaching, and assesses how this affects the value that wildlife viewing holds for tourists. Using contingent valuation and travel cost techniques, the annual viewing value of elephants was calculated at between US\$ 25-30 million. The paper recommends that more money should be invested in protecting elephants from poachers, which in the long run will generate more income through sustained tourist earnings.

**Coverage:** Africa

**Contains examples or case studies from:** Kenya

**Ecosystem or sector focus:** Protected Areas, Wildlife

**Topics:** Valuation, Contingent valuation, Travel cost, Financial mechanisms, Markets and charges

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**#38.** Brown, K., & Moran, D., (1993), *Valuing Biodiversity: The Scope and Limitations of Economic Analysis*. Centre for Social and Economic Research on the Global Environment: London. 30 pp.

The Biodiversity Convention recognises both the intrinsic value of biodiversity and its components, but also the need for greater understanding of valuation of these resources from an anthropocentric viewpoint. This paper discusses economic and other approaches to the valuation of biodiversity. Economic valuation is essentially a utilitarian approach which distinguishes use and non-use values of the assets involved. It is argued that these approaches have shortcomings, especially in the cultural, intrinsic and primary aspects of value. For example, cultural values of medicinal plants tend not to be included in demonstrative economic valuation, yet in many areas fundamentally determine the resource management of species rich areas and context of habitat conversion. Recognising its limitations, economic analysis does have a role in conservation policy. It is therefore vital that



practitioners and protagonists converge in order to develop an enhanced understanding of the values of biodiversity.

**Coverage:** Global

**Topics:** Valuation, Convention on Biological Diversity

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**#39.** Brown, K., Pearce, D., Perrings, C., & Swanson, T., (1993), *Economics and the Conservation of Global Biodiversity*. Working Paper No 2, The Global Environment Facility: Washington DC. 75 pp. ISBN 1-884122-01-9

This paper explores the relationship between economics and biodiversity conservation. It deals with the concepts of costs and benefits as they apply to biodiversity, assesses what is currently known about extinction rates and species loss, and looks at efforts to place a value on biodiversity. It also investigates the economic causes of biodiversity loss. Finally, the paper considers ways in which the GEF might alleviate the problem of under-investment in biodiversity.

**Coverage:** Global

**Topics:** Convention on Biological Diversity, Valuation, Economic instruments, Causes of biodiversity loss, Deforestation

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**#40.** Brown, P., (1998), *Economic and Legal Tools to Support Ecosystem Management in the United States*. World Resources Institute: Washington DC. 50 pp.

This document is intended to serve as a resource for landowners, policy makers from local to national levels, as well as public and private land managers who would like to improve the environmental management of their lands and are seeking information and financial resources to do so. It describes a range of economic and legal instruments, their advantages and disadvantages, and illustrates these with case studies from the USA. Actions required to implement each tool are also outlined.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Forests, Wetlands, Marine and coastal, Agriculture, Drylands

**Topics:** Financial mechanisms, Incentive measures, Causes of biodiversity loss, Economic instruments

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**#41.** Cabrera, M. A., Seijo, J. C., Euan, J., & Perez, E. (1998). 'Economic values of ecological services from a mangrove ecosystem', *Intercoast Network* 32:1-2

This article reports on a valuation study carried out to assess the Terminos Lagoon. It quantifies the value of destructive harvesting practices and economic activities, and also looks at the value of different mangrove goods and services.

**Coverage:** Latin America

**Contains examples or case studies from:** Mexico

**Ecosystem or sector focus:** Marine and coastal, Wetlands

**Topics:** Valuation

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**#42.** Carson, R. T. (1998). 'Valuation of tropical rainforests: philosophical and practical issues in the use of contingent valuation', *Ecological Economics* 24 (1):15-29

This paper explores the possibility of using a large-scale multi-country contingent valuation study for making decisions concerning global resources in the specific context of valuing a large set of tropical rainforests. Before considering the practical issues involved in implementing such a study, the paper addresses philosophical issues related to the use of contingent valuation including the role of passive use motives such as altruism and the role of information. The implications of empirically based criticisms which argue that contingent valuation results are unreliable are also considered. The main portion of the paper sketches the practical difficulties likely to be encountered in actually implementing a large contingent valuation study in multiple countries which seeks to value a common set of tropical rainforests.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Valuation, Contingent valuation

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**#43.** Casellini, N., Foster, K., & Hien, B. T. T., (1991), *The "White Gold" of the Sea: A Case Study of Sustainable Harvesting of Swiftlet Nest in Coastal Vietnam*. IUCN - The World Conservation Union, Vietnam Office: Hanoi. 63 pp.

The sustainable exploitation of wild natural resources, such as the nest from the edible-nest swiftlets, has been achieved in Vietnam without external aid or expertise. This study examines economic aspects of this trade and argues that this is an importance source of sustainable revenue for Vietnam. It also documents attempts made by a private company to invest in scientific research and monitoring of harvesting, and to their human and financial management procedures.

**Coverage:** Asia

**Contains examples or case studies from:** Vietnam

**Ecosystem or sector focus:** Marine and coastal, Wildlife

**Topics:** Trade, Valuation, Incentive measures

**Other:** Also published in Vietnamese.

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**#44.** Cesar, H., (1996), *The Economic Value of Indonesian Coral Reefs*. Agriculture Operations Division and Environment Department, World Bank: Washington DC. 9 pp.

This paper looks at the economic value of the benefits associated with coral reefs in Indonesia. It also addresses the economic threats to reef biodiversity. It investigates the private and social economic trade offs involved in reef conservation, and concludes that the private benefits associated economic activities that lead to reef destruction are often great, but the social costs are also high. Government action is required to stop these threats.

**Coverage:** Asia

**Contains examples or case studies from:** Indonesia

**Ecosystem or sector focus:** Fisheries, Marine and coastal

**Topics:** Valuation, Economic policies, Causes of biodiversity loss

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**#45.** Cesar, H., Lundin, C. G., Bettencourt, S., & Dixon, J. (1997). 'Indonesian coral reefs - an economic analysis of a precious but threatened resource', *Ambio* 26 (6):345-545

Indonesia's coral reefs are currently undergoing rapid destruction from human activities such as poison fishing, blast fishing, coral mining, sedimentation, pollution and over-fishing. These destructive activities are described and their private gains valued. It is shown that the social costs by far outweigh private gains. The paper concludes with a discussion on designing appropriate policy responses to these problems

**Coverage:** Asia

**Contains examples or case studies from:** Indonesia

**Ecosystem or sector focus:** Marine and coastal, Fisheries

**Topics:** Valuation, Economic instruments, Incentive measures, Market valuation, Disincentives, Causes of biodiversity loss, Economic policies

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**#46.** Chomitz, K. M., Brenes, E., & Constantino, L., (1998), *Financing environmental services: the Costa Rica experience and its implications*. Development Research Group and Environmentally and Socially Sustainable Development, Latin America and Caribbean Region, World Bank: Washington DC.

This paper describes an on-going initiative in Costa Rica - attempts to achieve environmental goals by creating markets for the environmental benefit of forests. This initiative takes a proposition from theoretical economics - that forests would be better maintained if forest owners were compensated for all the services they provide - and puts it to work in the real world. The paper describes both the theory of this initiative, the practical problems that Costa Rica has faced, and also identifies the issues and challenges that remain in the future implementation of this initiative.

**Coverage:** Latin America

**Contains examples or case studies**

**from:** Costa Rica

**Ecosystem or sector focus:** Forests, Water, Watersheds

**Topics:** Economic instruments, Financial mechanisms, Incentive measures, Markets and charges, Payments for environmental services, Carbon offsets, Debt conversion, Trust Funds

**#47.** Chomitz, K. M., & Kumari, K. (1998). 'The domestic benefits of tropical forests: a critical review', *The World Bank Research Observer* 13 (1):13-35

Protecting tropical forests yields domestic economic benefits. This paper reviews attempts at the valuation and quantification of such benefits. It finds that the quantifiable benefits of forest preservation in providing hydrological services and non-timber forest products are highly variable. Locally important in some situations, these classes of domestic benefits may in general be smaller than popularly supposed. This underscores the need for financing conservation from the Global Environment Facility or other global sources rather than placing the burden entirely on domestic resources.

**Coverage:** Global, Asia, Latin America

**Contains examples or case studies**

**from:** Philippines, Thailand, China, Malaysia, Brazil, Mexico

**Ecosystem or sector focus:** Forests, Water, Watersheds

**Topics:** Land degradation, Soil erosion, Causes of biodiversity loss, Valuation, Economic instruments, Financial mechanisms

**#48.** Clayton, C., & Mendelsohn, R. (1993). 'The value of watchable wildlife: a case study of McNeil River', *Journal and Environmental Management* 39:101-106

This study measures the user value of McNeil River, a bear watching game sanctuary. The results of contingent valuation questions using both open-ended and discrete choice formats are compared. Adjusting for outliers in all models reveals the users are willing to pay an average of between US\$228 and US\$277 per person to visit this unique site.

**Coverage:** North America

**Contains examples or case studies**

**from:** USA

**Ecosystem or sector focus:** Wildlife, Protected Areas, Tourism

**Topics:** Valuation, Contingent valuation

**#49.** CNPPA, (1995), *Economic Assessment of Protected Areas: Guidelines for their Assessment*. IUCN - The World Conservation Union: Gland. 142 pp.

This document proposes an economic evaluation framework for protected areas. It illustrates this framework for economic assessment with various case studies from around the world.

**Coverage:** Global, Latin America, North America, Pacific, Australia and New Zealand

**Contains examples or case studies**

**from:** Belize, Fiji, USA, Australia, Canada

**Ecosystem or sector focus:** Wildlife, Forests, Marine and coastal, Protected Areas

**Topics:** Valuation

**#50.** Conservation International, (1997), *The Economics of Biodiversity Conservation in the Brazilian Atlantic Forest*. Project Profile Number 1, Conservation International: Washington DC. 12 pp.

The Brazilian Atlantic forest is perhaps the most striking example of a conservation "hotspot"-rich in biodiversity, already heavily fragmented and under continued threat. In 1993, CI made a new investment in the area to test a question that has challenged conservationists for decades: how can we articulate the value of biodiversity? We know biodiversity has many values. Intact forests protect watersheds. They provide the genetic clues for many pharmaceuticals. They buffer the climatic system against change. They are the storehouse for traditional medicines. But in Southern Bahia, Brazil, these values often mean little to the individual landowner. The recent shift of international markets away from Bahian cocoa, the region's main agricultural product, has caused landowners to reconsider their traditional conservation of the forest and to begin logging it and converting it to cattle pasture. Against this background, we set out to assess the economics

of conservation around the Una Biological Reserve in Southern Bahia. We wanted to increase our understanding of economic choices in order to articulate the value of biodiversity at the level of the individual landowner. Our assessments produced striking results. For individual landowners, investments in livestock proved marginal at best and logging was profitable only for the very short term, while certain forms of conservation investments showed promise of producing higher returns. CI has used these research results to design a strategic set of conservation actions for the forest fragments that border the Una Reserve. For CI, our understanding of the economics of biodiversity is increased. Not all of our questions have been answered yet, but I believe our findings here in Bahia will be critically important for conservationists world-wide

**Coverage:** Latin America

**Contains examples or case studies from:** Brazil

**Ecosystem or sector focus:** Forests, Agriculture

**Topics:** Incentive measures, Valuation, Financial mechanisms, Causes of biodiversity loss, Bioprospecting

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**#51.** Convery, F. J., (1995), *Applying environmental economics in Africa*. World Bank Technical Paper, 277(157): Washington DC.

The paper intends to show how environmental economics could and should be used to improve the quality of decision making in the process of drawing up National Environmental Action Plans. After an introduction, there are 11 chapters, covering: a theoretical review; environmental management as development strategy; identifying perverse and positive incentives to environmental degradation; non-price incentives; property rights and tenure systems; general cost issues; estimating gross costs - a Ghana case study; evaluation of benefits; comparing benefits and costs; and institutional development and cultural dimensions. Two appendices cover the key literature and data sources and a hypothetical case study of the choices facing an African farmer.

**Coverage:** Africa

**Contains examples or case studies from:** Ghana

**Ecosystem or sector focus:** Forests, Protected Areas, Agriculture

**Topics:** Causes of biodiversity loss, Economic instruments, Economic policies, Valuation, Incentive measures

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**#52.** Costa, P. M., Salmi, J., Simula, M., & Wilson, C., (1999), *Financial Mechanisms for Sustainable Forestry*. Programme on Forests, United Nations Development Programme: New York. 122 pp.

This document outlines a comprehensive global financing strategy for the implementation of sustainable forest management. The core components of this strategy include the development of enabling conditions including appropriate policy frameworks, the targeted use of concessionary finance in leveraging private investment, and the co-ordinated development of widely applicable instruments for sustainable forest management financing.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Financial mechanisms, Economic instruments, Private sector, Trust Funds, Carbon offsets, Debt conversion

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**#53.** Costa, R., & Kennedy, E. T., (1996), *Safe Harbor for Endangered Species on Private Lands in the United States*. Paper presented at workshop on Incentives for Biodiversity: Sharing Experiences, 4th Global Biodiversity Forum, Montreal, Canada 30 August - 1 September 1996. 6 pp.  
<http://www.biodiversityeconomics.org>

This paper outlines efforts in North Carolina to provide incentives for the preservation of habitat for the endangered Red-cockaded woodpecker. The programme entails the establishment of 'safe harbours' for the woodpecker on private lands through a transferable certificate system which reserves land for sustainable development and use. The paper outlines the benefits of the programme on local and state wide levels, outlines several lessons from the project, and highlights recommendations for encouraging private sector involvement in conservation efforts.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Wildlife

**Topics:** Private sector, Economic instruments, Incentive measures, Markets and charges

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**#54.** Costanza, R. (Ed.), (1991), *Ecological Economics: the Science and Management of Sustainability*. Columbia University Press: New York. 525 pp. ISBN 0-231-07562-6

This book brings together different aspects of ecological economics including accounting, modelling and analysis of ecological economic systems, and necessary institutional changes and case studies.

**Coverage:** Global

**Topics:** Valuation, Incentive measures, Economic policies, Trade, Disincentives, Causes of biodiversity loss, Taxes, Subsidies

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**#55.** Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R. O., Paruelo, J., Raskin, R. G., Sutton, P., & van den Belt, M. (1997). 'The value of the world's ecosystem services and natural capital', *Nature* 387 (May):253-260

The services of ecological systems and the natural capital stocks that produce them are critical to the functioning of the Earth's life support systems. They represent part of the economic value of the planet. This article presents the findings of a study which estimates the current economic value of 17 ecosystem services for 16 biomes, based on published studies and original calculations.

**Coverage:** Global

**Ecosystem or sector focus:** Marine and coastal, Forests, Savannahs, Drylands, Wetlands, Agriculture

**Topics:** Valuation

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**#56.** Costanza, R., Farber, S., & Maxwell, J. (1989). 'Valuation and management of wetland ecosystems', *Ecological Economics* 1:335-361

This article reports on a study of wetland values in coastal Louisiana that employed both

willingness to pay and energy analysis based methodologies and were able to bracket a range of values within which the authors are confident that the true value lies. However there remains a large amount of uncertainty. The current estimate for the total present value of an average acre of natural wetlands in Louisiana are US\$ 2,429-US\$ 6,400 per acre (assuming an 8% discount rate) to US\$ 8,977-17,000 per acre (assuming a 3% discount rate). At the lowest value, the current annual rate of loss of Louisiana wetlands (50 square miles per year) is worth about US\$ 77 million. At the largest value it is worth about US\$ 544 million. This paper discusses the fundamental theoretical and practical problems underlying natural resource valuation, summarises the methods and findings for the case of Louisiana and elaborates on some of the more recalcitrant problems attending applied natural resource valuation, including discounting and dealing with uncertainty and imprecision. The discount rate makes more difference in the final result than any other factor, and yet there is much disagreement about the appropriate approach to discounting natural resources. This problem is discussed, and an argument made for lower discount rates to be applied to the valuation of renewable natural resources.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Wetlands, Water, Fisheries, Tourism

**Topics:** Valuation, Contingent valuation, Effect on production, Replacement costs

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**#57.** Council for Agricultural Science and Technology, (1999), *Benefits of Biodiversity*. Task Force Report No. 133, Council for Agricultural Science and Technology. 33 pp.

This document argues that productive and efficient agriculture, which is the foundation of modern successful societies, has depended on biodiversity and will be even more dependent on it in the centuries ahead. Yet expanding human activities are threatening this biodiversity, and thus compromising the long-term sustainability, productivity and stability of agriculture and society. The document looks at the economic benefits of biodiversity, focusing on agricultural systems and agrobiodiversity. It presents a number of examples of the value of



agrobiodiversity, and makes recommendations about the need to conserve biodiversity, preserve natural areas, preserve plant and animal germplasm, and increase the effective use of diversity in agriculture.

**Coverage:** Global, North America, Latin America, Africa

**Contains examples or case studies from:** USA, Costa Rica, Kenya

**Ecosystem or sector focus:** Agriculture

**Topics:** Valuation

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**#58.** Crowards, T. (1996). 'Natural Resource Accounting: a case study of Zimbabwe', *Environmental and Resource Economics* 7:213-241

There is as yet no consensus on the most appropriate way to incorporate the degradation of natural capital into national income accounting procedures. The net price method is used to adjust the national accounts of Zimbabwe for the depletion of forests, soils and mineral resources for the period 1980-89. The results suggest that the economic depreciation of natural resources represents approximately 2% of GDP. The implications for integrating natural resource depletion into policy making, within the current policy climate, are then addressed.

**Coverage:** Africa

**Contains examples or case studies from:** Zimbabwe

**Ecosystem or sector focus:** Agriculture, Forests, Industry

**Topics:** Soil erosion, Environmental accounting, Valuation, Economic policies

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**#59.** de Alessi, M., (1996), *Oysters in the Willapa Bay*. Paper presented at a workshop on Incentives for Biodiversity: Sharing Experiences, 4th Global Biodiversity Forum, Montreal, Canada 30 August - 1 September 1996. 3 pp. <http://www.biodiversityeconomics.org>

This paper outlines the importance of the private ownership of tidelands to the conservation of the coastal waters. A long tradition of ownership of tidal waters by oyster-men who farmed these waters has created a strong impetus for private stewardship and resource enhancement which is

now threatened by a desire to regulate the resource by the Washington State Government. This paper argues for continued local management of coastal resources.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Marine and coastal, Fisheries

**Topics:** Incentive measures, Private sector

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**#60.** des Clers, B., (1998), *Financial Innovations for Biodiversity: Financing Emergency Actions for Biodiversity*

*Conservation*. Paper presented at a workshop on Financial Innovations for Biodiversity, 10th Global Biodiversity Forum, Bratislava, Slovakia, 1-3 May 1998. 10 pp.

<http://www.biodiversityeconomics.org>

The authors wish to highlight the roots of the problems which lead to loss of biodiversity on this planet and suggest some financial mechanisms to provide the very large recurrent income necessary to stop present trends in biodiversity loss. The preservation of tens of millions of hectares requires recurrent financial resources of tens of billions of dollars each year in order to secure the integrity of those ecosystems by compensating governments and local stakeholders for the loss of income and opportunities for alternative development which this preservation requires. Furthermore, the inventories of the planet's biological diversity will take time, possibly 50 or 100 years or more, and therefore the expenditures for preservation during such extended periods must be made on an ongoing, recurrent basis, during which resources could be submitted to "soft" use, monitoring, research and adaptive management. Various emergency actions are needed. Cultural and social values as well as economical systems tend, in many cases, to favour individual gains rather than collective benefits (prisoner's dilemma). In such cases, regulations, taxes, incentives or artificial market mechanisms are the best way to prevent the collective goods subject to degradation coming from destructive activities serving individual interests. There are certainly many different ways to finance emergency actions for biodiversity, some of which are more equitable than others. Here again, our proposal does not pretend to be the best or only one. It is rather to

find an efficient mechanism, readily operational, which will enable countries to both take national measures and to do so participating in an international effort. A significant excise tax (10% or more) should be levied by each country on natural products (flora and fauna), to raise the multi billion dollars per year required. Most natural products traded internationally should be able to bear the weight of an additional tax at such a level. The income from such a tax to remain in the country of origin and be earmarked for national programs of biodiversity conservation. An international body such as GEF or other donor agencies, might additionally support those countries which exports of natural goods are much lower than their conservation needs.

**Coverage:** Global

**Topics:** Financial mechanisms, Economic instruments

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**#61.** Dixon, J. A., & Sherman, P. B., (1990), *Economics of Protected Areas: A New Look at Benefits and Costs*. Earthscan Publications Ltd: London. 234 pp. ISBN 1-85383-097-6

The true economic value of protected areas, including national parks, scientific reserves, wildlife sanctuaries, natural monuments and landmarks, is often difficult to measure. They may be the repository of unique or very valuable natural assets, yet the short-term gains from exploiting their natural resources can often appear more attractive than the long-term benefits of conservation. This book helps government and non-governmental agencies to assess the costs and benefits associated with maintaining protected areas. It also provides methodologies for valuing these benefits and costs in monetary terms. Case studies are presented of the valuation of protected areas from Asia, Africa, Latin America and the Caribbean.

**Coverage:** Global, Africa, Asia, Latin America, Caribbean

**Contains examples or case studies from:** Thailand, British Virgin Islands, Australia, Cameroon, Netherlands Antilles, St Vincent, Kenya, Indonesia

**Ecosystem or sector focus:** Protected Areas, Wildlife, Forests, Water, Tourism

**Topics:** Valuation, Economic instruments, Economic policies, Incentive measures, Causes of biodiversity loss

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**#62.** Dyer, G., & Belausteguigoitia, J. C., (1996), *Structural Adjustment, Market and Policy Failures: The Case of Maize*. Paper presented at IUCN Workshop on Economics of Biodiversity Loss, April 1996, Gland, Switzerland. 14 pp.

<http://www.biodiversityeconomics.org>

This paper analyses the effects of structural adjustment policies in agriculture on crop diversity. The specific case of maize in Mexico is studied. The Mexican government has introduced high yielding varieties (HYVs) of maize into the agricultural sector in an attempt to increase productivity. In terms of biodiversity impact, the result has been a shift from traditional varieties of maize to HYVs and consequently a loss of maize diversity. The main problem is that the benefits from crop diversity are not internalised in the market system and they are therefore not taken into account by national policy-makers. The suggestion made in the paper is that policy-making must take place more at the local level and be conducted in consultation with local peasants. Structural adjustment policies in agriculture too often fail to consider effects at the micro-economic level. One of these effects can be, as in the case of maize in Mexico, biodiversity loss.

**Coverage:** Latin America

**Contains examples or case studies from:** Mexico

**Ecosystem or sector focus:** Agriculture

**Topics:** Incentive measures, Economic policies, Causes of biodiversity loss, Subsidies, Taxes

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**#63.** Earthwatch Institute, (2000), *Case Studies in Business and Biodiversity*. Earthwatch Institute(Europe): Oxford. 31 pp. ISBN 0-9538179-2-X

This booklet has been produced to encourage businesses to support the UK National Biodiversity Strategy and Action Plan. It provides examples of best practice in biodiversity engagement, and uses case studies of a water utility, leisure industry, airport, oil company and financial institution.

**Coverage:** Europe

**Contains examples or case studies from:** UK

**Ecosystem or sector focus:** Industry, Infrastructure, Urban settlements

**Topics:** Private sector, Economic instruments, Financial mechanisms

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**#64.** Earthwatch Institute, (1999), *Business and Biodiversity*. Earthwatch Institute(Europe): Oxford. 19 pp.

This booklet provides a framework for involving the private sector in biodiversity conservation. It has been produced as a guide for all businesses who wish to support the UK's National Biodiversity Strategy and Action Plan.

**Coverage:** Europe

**Contains examples or case studies from:** UK

**Ecosystem or sector focus:** Industry, Infrastructure, Urban settlements

**Topics:** Private sector, Economic instruments, Financial mechanisms

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**#65.** Eaton, D., & Sarch, M.-T., (1997), *The Economic Importance of Wild Resources in the Hadejia-Nguru Wetlands, Nigeria*. CREED Working Paper No 13, International Institute for Environment and Development: London. 41 pp.

The Hadejia-Nguru wetlands play a major role in the regional economy of northern Nigeria. This paper goes beyond attempts have been made to value the production of most of the major sub-systems in the floodplain, and looks at the economic value of wild resources. The aim of this study was to provide new information for development planning in the region by increasing the understanding of local economic activities. A variety of values including financial and economic values, and returns to labour, are presented.

**Coverage:** Africa

**Contains examples or case studies from:** Nigeria

**Ecosystem or sector focus:** Wetlands

**Topics:** Valuation

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**#66.** Emerton, L. A., (1998), *Using Economics for Biodiversity Strategies and Action Plans in Eastern Africa*. Biodiversity and Economics Programme, IUCN - The World Conservation Union, Eastern Africa Regional Office: Nairobi. 44 pp.

This manual provides a framework and methodology for integrating economic concerns into NBSAPs, including economic policy analysis, valuation, cost and benefit distribution, incentive measures and financing mechanisms. The application of these methods is illustrated with case studies from the Eastern Africa region.

**Coverage:** Africa

**Contains examples or case studies from:** Seychelles, Uganda, Eritrea, Djibouti, Sudan, Kenya, Tanzania

**Ecosystem or sector focus:** Marine and coastal, Protected Areas, Water, Wetlands, Wildlife, Forests, Agriculture

**Topics:** National Biodiversity Strategies and Action Plans, Valuation, Incentive measures, Economic planning, Economic policies, Convention on Biological Diversity, International Conventions, Economic instruments, Financial mechanisms, Causes of biodiversity loss

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**#67.** Emerton, L. A., (1998), *Economics Tools for Valuing Wetlands in Eastern Africa*. Biodiversity and Economics Programme, IUCN - The World Conservation Union, Eastern Africa Regional Office: Nairobi. 21 pp.

This manual provides a framework and methodology for valuing wetlands. The application of these methods is illustrated with case studies from the Eastern Africa region.

**Coverage:** Africa

**Contains examples or case studies from:** Seychelles, Uganda, Eritrea, Djibouti, Sudan, Kenya, Tanzania, Zambia

**Ecosystem or sector focus:** Wetlands, Protected Areas, Water, Wildlife, Forests, Agriculture

**Topics:** Valuation, Incentive measures, Economic planning, Economic policies, Economic instruments, Financial mechanisms, Causes of biodiversity loss

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**#68.** Emerton, L. A., (1999), *Community Economic Incentives for Nature Conservation*. IUCN - The World Conservation Union: 41 pp.

This manual provides a framework for identifying, using and applying economic incentives measures to community based conservation. It also includes a list of relevant literature and a series of detailed case studies of the use of economic incentive measures for community nature conservation.

**Coverage:** Global, Africa

**Contains examples or case studies from:** Kenya, Tanzania, Uganda

**Ecosystem or sector focus:** Forests, Wetlands, Water, Wildlife, Protected Areas

**Topics:** Economic instruments, Incentive measures, Financial mechanisms, Causes of biodiversity loss, Economic planning

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**#69.** Emerton, L. A., (1999), *Mount Kenya: the Economics of Community Conservation*. International Institute for Environment and Development: London. 20 pp. ISBN 15618382

This study illustrates how traditionally exclusionist approaches to forest conservation can lead to a situation where local communities are economically marginalised. Simultaneously a range of policy and market failures discriminate against sustainable forest management as an economically viable land use option in Mount Kenya. The paper proposes a number of economic and financial mechanisms which may better capture the forest's economic benefits and provide economic incentives for forest conservation.

**Coverage:** Africa

**Contains examples or case studies from:** Kenya

**Ecosystem or sector focus:** Forests, Watersheds, Wildlife, Protected Areas

**Topics:** Valuation, Causes of biodiversity loss, Incentive measures, Disincentives, Economic instruments, Financial mechanisms

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**#70.** Emerton, L. A., (1999), *Balancing the Opportunity Costs of Wildlife Conservation for Communities Living Around Lake Mburo National Park, Uganda*. International Institute for Environment and Development: London. 27 pp. ISBN 15618382

This study values the economic benefits and costs of Lake Mburo National Park for the park's managing authorities and for local communities. It finds that the opportunity costs incurred by the park effectively outweigh local benefits generated, and that revenues are inadequate to cover the park's management costs. It is concluded, to address these problems, that there must be an increasing emphasis placed on more innovative financing mechanisms to cover these gaps between costs and benefits.

**Coverage:** Africa

**Contains examples or case studies from:** Uganda

**Ecosystem or sector focus:** Wetlands, Wildlife, Protected Areas

**Topics:** Valuation, Causes of biodiversity loss, Incentive measures, Disincentives, Economic instruments, Financial mechanisms

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**#71.** Emerton, L. A., (1999), *Building economics into National Biodiversity Strategies and Action Plans*. Paper presented at workshop on Building Biodiversity into Sectoral Strategies and Action Plans, 14th Global Biodiversity Forum, 18-20 June 1999, Montreal. 11 pp.

<http://www.biodiversityeconomics.org>

This paper looks at lessons learned and best practices in the use of economics for Biodiversity Strategies and Action Plans. It is illustrated with examples from Eastern Africa.

**Coverage:** Global, Africa

**Contains examples or case studies from:** Uganda, Djibouti, Eritrea, Seychelles

**Topics:** Economic instruments, Incentive measures, Causes of biodiversity loss, Valuation, Economic planning, Financial mechanisms

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**#72.** Emerton, L. A., (1999), *The Nature of Benefits and the Benefits of Nature: Why Wildlife Conservation Has Not Economically Benefited Communities in Africa*. Community Conservation Research in Africa: Principles and Comparative Practice, Paper No 9, Institute for Development Policy and Management, University of Manchester: Manchester. 20 pp. ISBN 1 900728931

Community-oriented approaches to wildlife conservation usually have a strong economic rationale. They are typically based on the premise that if local people participate in wildlife management and economically benefit from this participation, then a "win-win" situation will arise whereby wildlife is conserved at the same time as community welfare improves. This paper describes how the economic rationale behind such benefit-based approaches to community conservation - that communities must benefit from wildlife if they are to be willing and able to conserve it - is sound. It constitutes a major advance from traditional exclusionist approaches to wildlife conservation which were largely based on denying community access and gain from wildlife, and has undoubtedly resulted in the more equitable distribution of wildlife benefits. The paper however argues that such benefit-based models are based on an incomplete understanding of the economics of community conservation and of the nature of wildlife benefits. Over the long term they may lead neither to community welfare improvement nor contribute to wildlife conservation. Benefit distribution is a necessary, but in itself may not be a sufficient, condition for communities to engage in wildlife conservation. Whether or not communities have economic incentives to conserve wildlife, and whether or not they are economically better off in the presence of wildlife, goes far beyond ensuring that a proportion of wildlife revenues are returned to them as broad development or social infrastructure benefits. It also depends on the economic costs that wildlife incurs, on the form in which wildlife benefits are received, on the costs and benefits of other economic activities which compete with wildlife and on a range of external factors which all limit the extent to which communities are able to appropriate wildlife benefits as real livelihood gains. Community incentives to conserve wildlife, and the conditions they depend on, vary at different times for different people. Additional economic considerations need to be incorporated into

community approaches to wildlife conservation, and form a part of whether such approaches can be judged to have been successful in development and conservation terms.

**Coverage:** Africa

**Contains examples or case studies**

**from:** Kenya, Tanzania, Uganda, South Africa, Zimbabwe, Namibia

**Ecosystem or sector focus:** Wildlife, Forests, Protected Areas

**Topics:** Causes of biodiversity loss, Economic policies, Economic instruments, Incentive measures, Causes of biodiversity loss, Valuation

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**#73.** Emerton, L. A., (1999), *Economics Tools for the Management of Marine Protected Areas in Eastern Africa*. Biodiversity and Economics Programme, IUCN - The World Conservation Union, Eastern Africa Regional Office: Nairobi. 24 pp.

This manual provides a framework and methodology for using economic tools for the management of marine protected areas. The application of these methods is illustrated with case studies from the Eastern Africa region.

**Coverage:** Africa

**Contains examples or case studies**

**from:** Seychelles, Eritrea, Djibouti, Sudan, Kenya, Tanzania

**Ecosystem or sector focus:** Marine and coastal, Protected Areas, Wildlife, Forests, Agriculture

**Topics:** Valuation, Incentive measures, Economic planning, Economic policies, Economic instruments, Financial mechanisms, Causes of biodiversity loss

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**#74.** Emerton, L. A., (1999), *Economics Tools for Environmental Planning and Management in Eastern Africa*. Biodiversity and Economics Programme, IUCN - The World Conservation Union, Eastern Africa Regional Office: Nairobi. 43 pp.

This manual provides a framework and methodology for integrating economic concerns into environmental planning and management, including economic policy analysis, valuation, cost



and benefit distribution, incentive measures and financing mechanisms. The application of these methods is illustrated with case studies from the Eastern Africa region.

**Coverage:** Africa

**Contains examples or case studies**

**from:** Seychelles, Uganda, Eritrea, Djibouti, Sudan, Kenya, Tanzania, Zambia

**Ecosystem or sector focus:** Marine and coastal, Protected Areas, Water, Wetlands, Wildlife, Forests, Agriculture

**Topics:** Valuation, Incentive measures, Economic planning, Economic policies, Economic instruments, Financial mechanisms, Causes of biodiversity loss

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**#75.** Emerton, L. A., (2000), *Economics and the Convention on Biological Diversity*. IUCN - The World Conservation Union: Nairobi. 5 pp.

This short paper outlines the links between economics and the CBD, focusing on economic valuation, incentive measures, assessment and financing mechanisms. It provides a framework for integrating economic concerns into biodiversity planning.

**Coverage:** Global

**Topics:** Valuation, Convention on Biological Diversity, Economic instruments, Economic policies, Financial mechanisms, Incentive measures, Disincentives, Causes of biodiversity loss, National Biodiversity Strategies and Action Plans

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**#76.** Emerton, L. A., (2000), *Using Economic Incentives for Biodiversity*. IUCN - The World Conservation Union: Nairobi. 26 pp.

This document looks at the role of economic incentive measures in the CBD. It provides an overview of different types of incentive measures for biodiversity, illustrating each with case studies from around the world.

**Coverage:** Global, Caribbean, Pacific, Asia, Africa, Europe, Latin America

**Contains examples or case studies**

**from:** South Africa, St Lucia, Nepal, Kenya, New Zealand, Cyprus, USA, Eritrea, Brazil, Canada, DR Congo, Seychelles, Malawi, Philippines,

Tanzania, Uganda, Zambia, Ghana, Madagascar, Nigeria, Jamaica, Zimbabwe

**Ecosystem or sector focus:** Forests, Protected Areas, Agriculture, Wildlife, Marine and coastal, Drylands, Savannahs, Fisheries

**Topics:** Valuation, Incentive measures, Convention on Biological Diversity, Causes of biodiversity loss, Economic instruments, Economic policies, Financial mechanisms, Economic instruments, Disincentives, Property rights, Private sector, Markets and charges, Taxes, Subsidies, Bonds and deposits

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**#77.** Emerton, L. A., & Ferrin, R., (2000), *Usando la Economía para las Estrategias de Biodiversidad y Planes de Acción en América Latina*. IUCN - The World Conservation Union, South America Regional Office: Quito. 55 pp.

This manual provides a framework and methodology for integrating economic concerns into NBSAPs, including economic policy analysis, valuation, cost and benefit distribution, incentive measures and financing mechanisms. The application of these methods is illustrated with case studies from the Latin America region.

**Coverage:** Latin America, Caribbean

**Contains examples or case studies**

**from:** Honduras, Bolivia, Brazil, Mexico, Peru, El Salvador, Venezuela, Costa Rica, Nicaragua, Ecuador, Netherlands Antilles, Chile, Colombia, Guatemala, Jamaica, Paraguay, Panama

**Ecosystem or sector focus:** Marine and coastal, Protected Areas, Water, Wetlands, Wildlife, Forests, Agriculture

**Topics:** National Biodiversity Strategies and Action Plans, Valuation, Incentive measures, Economic planning, Economic policies, Convention on Biological Diversity, International Conventions, Economic instruments, Financial mechanisms

**Other:** Spanish language publication.

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**#78.** Emerton, L. A., & Mfunda, I., (1999), *Making Wildlife Economically Viable for Communities Living Around the Western Serengeti, Tanzania*. International Institute for

Environment and Development: London. 31 pp.  
ISBN 15618382

This study analyses the economic costs and benefits of wildlife for local landholders, and explains why the high opportunity costs of wildlife, coupled with low economic benefits from the Serengeti National Park, have failed to present local economic incentives for conservation. It documents a number of innovations that have recently taken place in business partnerships between local villages and the private sector, and argues that these arrangements may have the potential to redress current imbalances in wildlife economic costs and benefits.

**Coverage:** Africa

**Contains examples or case studies from:** Tanzania

**Ecosystem or sector focus:** Wildlife, Protected Areas

**Topics:** Valuation, Causes of biodiversity loss, Incentive measures, Disincentives, Economic instruments, Financial mechanisms

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**#79.** Englin, J., & Mendelsohn, R. (1991). 'A hedonic travel cost analysis for valuation of multiple components of site quality: the recreation value of forest management', *Journal of Environmental Economics and Management* 21:275-290 pp

One benefit of managing forests is that one can alter the qualities of sites. The value of changing site qualities, however, is generally not known. This paper develops a formal hedonic travel cost model which can be used to estimate the value of both marginal and non-marginal changes to sites. This approach accommodates multiple simultaneous changes in site characteristics. Estimating this model using a set of permits from wilderness areas leads to revealed preference estimates of the recreational value of clear-cuts, old-growth, and nine other wilderness attributes.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Forests, Protected Areas

**Topics:** Valuation, Travel cost

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**#80.** Feather, P., Hellerstein, D., & Hansen, L., (1999), *Economic Valuation of Environmental Benefits and the Targeting of Conservation Programs: The Case of the CRP*. Resource Economics Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 778: Washington DC.

The range of environmental problems confronting agriculture has expanded in recent years. As the largest program designed to mitigate the negative environmental effects of agriculture, the Conservation Reserve Program (CRP) has broadened its initial focus on reductions in soil erosion to consider other landscape factors that may also be beneficial. For example, preserving habitats can help protect wildlife, thus leading to more nature-viewing opportunities. This report demonstrates how non-market valuation models can be used in targeting conservation programs such as the CRP.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Agriculture, Forests, Protected Areas, Wildlife

**Topics:** Valuation

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**#81.** Ferraro, P. J., & Simpson, D. R., (2000), *The Cost-Effectiveness of Conservation Payments*. Discussion Paper 00-31, Resources for the Future: Washington DC. 29 pp.

Intact ecosystems provide important global services. Many valuable ecosystems are located in low-income countries in which citizens are not in a position to provide global public goods gratis. To address this problem, international conservation and development donors have been making substantial investments in habitat conservation. Among the more common conservation schemes are interventions aimed at encouraging commercial activities that produce ecosystem services as joint products. We argue that it would be more cost-effective to pay for conservation performance directly. We use a simple yet general model to establish three conclusions. First, the overall cost of conservation is least when direct payments are employed. Second, the donor will generally find

direct payments more cost-effective. Third, the preferences of donors and eco-entrepreneurs are opposed: when the donor prefers direct payments, the eco-entrepreneur prefers indirect subsidies. There are a number of reasons why direct incentive programs may be difficult to implement. We argue, however, that any approach to conservation will face similar challenges. Furthermore, we demonstrate with an empirical example that direct payment initiatives can offer spectacular cost-savings relative to less direct approaches. We therefore believe that continued experimentation with direct conservation incentives in the developing world is warranted and will prove successful.

**Coverage:** Global

**Topics:** Incentive measures, Financial mechanisms

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**#82.** Foley, M.-E., Moussa, J., & Verolme, H. J. H., (1999), *Addressing the Underlying Causes of Deforestation and Forest Degradation - Case Studies, Analysis and Policy Recommendations*. Biodiversity Action Network: Washington DC. 141 pp. ISBN 0-9669599-0-6

This reports on a global workshop looking at the underlying causes of forest degradation. It identifies the actions that are required to halt forest loss, and presents a number of regional and country case studies from Africa, Asia, CIS, Europe, Latin America, North America and Oceania.

**Coverage:** Global, Africa, Asia, Commonwealth of Independent States, Europe, Latin America, North America, Pacific, Australia and New Zealand

**Ecosystem or sector focus:** Forests

**Topics:** Deforestation, Economic policies, Causes of biodiversity loss, Incentive measures, Disincentives

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**#83.** Furst, E., (1996), *Environmental and Natural Resource Valuation Methodologies in Latin America and the Caribbean: An Assessment of Five Case Studies*. Centro Internacional en Política Económica Para El Desarrollo Sostenible, Universidad Nacional de Costa Rica: San Jose. 12 pp.

This paper contains a summary of the analysis of five case studies that were chosen from a preselection of about 25 pieces of work on the economic valuation of natural resources and environmental quality in Latin America and the Caribbean. These include valuations of air pollution in Chile, Coral reef degradation in the Netherlands Antilles, rural water supply in Haiti, rainforest conservation in Mexico and mangrove deforestation in Nicaragua. Conclusions drawn include that although these studies present important policy recommendations, it is questionable how much this information will actually be used and applied by policy makers and decision makers. It is also apparent that there are large differences in access to research resources and information, and that the accuracy and reliability of results are also highly variable. Differences also exist in the way that authors deal with different economic and environmental issues, and the importance they accord to them.

**Coverage:** Global, Latin America, Caribbean

**Contains examples or case studies from:** Mexico, Nicaragua, Haiti, Netherlands Antilles, Chile

**Ecosystem or sector focus:** Marine and coastal, Forests, Water, Protected Areas, Urban settlements, Infrastructure, Industry

**Topics:** Valuation, Pollution

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**#84.** Gammage, S., (1997), *Estimating the Returns to Mangrove Conversion: Sustainable Management or Short Term Gain?* Environmental Economics Programme Discussion Paper 97-02, International Institute for Environment and Development: London.

This study was carried out to make an economic comparison of different management options for mangroves in Gulf of Fonseca, El Salvador. It involved the valuation of a range of different mangrove products, using a range of different methods. Timber and fuelwood were valued using actual market prices, input costs and volumes harvested. These values were cross-checked with values generated using surrogate prices for timber and fuelwood of the next most likely available substitute. Thus fuelwood was also valued using the price of propane gas as a substitute, and other types of imported timber. In order to assess the value of resource use associated with different management scenarios, estimates were made of

the effects of mangrove conservation and degradation on the yields and values of products.

**Coverage:** Latin America

**Contains examples or case studies from:** El Salvador

**Ecosystem or sector focus:** Marine and coastal, Forests, Fisheries

**Topics:** Valuation, Market valuation

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**#85.** Godoy, R., Lubowski, R., & Markandya, A. (1993). 'A method for the economic valuation of non-timber tropical forest products', *Economic Botany* 47 (3):220-233

By drawing on quantitative studies in social anthropology, zoology, ethnobotany and economics, this article presents a method for conducting a valuation of non-timber forest products. A review of 24 studies, conducted in various countries, suggests that the median value for non-timber forest products is about US\$50/ha/year. The article discusses problems with past studies and suggests ways to get better estimates of output quantities, marginal costs and prices.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Valuation, Market valuation, Contingent valuation

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**#86.** Gray, J. A. (1997). 'Underpricing and overexploitation of tropical forests: forest pricing in the management, conservation, and preservation of tropical forests', *Journal of Sustainable Forestry* 4:1-2

Forest pricing policies for tropical timber and forest concessions can play an important role in the management, conservation, and preservation of tropical forests. The paper draws on regional studies by the author and others of forest revenue systems and forest concession arrangements, country case studies, and studies in individual countries of West and Central Africa and South East Asia. Forest pricing and concession management policies, problems, and experiences in individual countries are examined, common problems and experiences highlighted, and alternatives identified. From these, the elements of a forest pricing and concession management

system which supports sustainable management, efficient utilisation, and forest renewal are developed.

**Coverage:** Global, Asia, Africa

**Ecosystem or sector focus:** Forests

**Topics:** Markets and charges, Valuation, Incentive measures, Causes of biodiversity loss

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**#87.** Green, C. H., & Tunstall, S. M. (1991). 'Is the economic evaluation of environmental resources possible?', *Journal and Environmental Management* 22:123-141

The meaningful economic evaluation of environmental goods depends both upon economic theory adequate and a congruence between economic and environmental theories of value. While the evaluation of user, and particularly the recreational and amenity aspects of environmental goods, is proving relatively straightforward, it is argued that there remain a number of theoretical as well as methodological problems before valid and reliable measurement of non-use values of environmental goods can be achieved. In particular, while individual preferences and willingness-to-pay for environmental goods may be for the continued existence of the good in general terms, values have to be associated with individual sites. Second, there is as yet little empirical evidence as to the motivations which underlie any such non-use values, although economists have speculated about bequest and existence values. Third, the population which benefits through such non-use values is unknown. A number of survey studies are reported that have attempted to address these questions.

**Coverage:** Global

**Topics:** Valuation, Contingent valuation

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**#88.** Gren, I.-M. (1995). 'The value of investing in wetlands for nitrogen abatement', *European Review of Agricultural Economics* 22:157-172

The values of nitrogen abatement through measures involving investment in wetlands, sewage treatment plans and agriculture are calculated and compared. The analytical results show that the marginal value of investment in wetlands, including current and future utility, is likely to exceed that of other measures. This is

due to two factors: the joint production of several environmental services and the net natural growth in the capacity to produce these services. The multifunctionality implies that, in addition to nitrogen abatement, other outputs such as buffering of water and biodiversity are produced jointly and the growth in wetlands, or the self organising capacity, implies an increase in the supply of future outputs. Examples are given for the case of Gotland, an area with a high concentration of nitrate in the groundwater, which suggest that the value of investment in wetlands could significantly exceed that of sewage treatment plants.

**Coverage:** Europe

**Contains examples or case studies from:** Sweden

**Ecosystem or sector focus:** Wetlands, Water, Agriculture

**Topics:** Pollution, Valuation

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**#89.** Gren, I.-M., Folke, C., Turner, R. K., & Bateman, I. (1994). 'Primary and secondary values of wetland ecosystems', *Environmental and Resource Economics* 4:55-74

Wetlands are continuously degraded in many parts of the world. One reason is the lack of appropriate valuation of the multifunctionality of wetlands. This paper discussed methods for valuing the primary and secondary values of wetlands. It presents three case studies of different valuation methods which to different degrees capture primary and secondary values. It is concluded that only part of the total economic value of wetlands can be captured in monetary terms.

**Coverage:** Europe

**Contains examples or case studies from:** UK, Sweden

**Ecosystem or sector focus:** Wetlands, Water

**Topics:** Valuation, Contingent valuation, Replacement costs, Mitigative and averted expenditures

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**#90.** Gren, I.-M., & Soderquist, T., (1994), *Economic Valuation of Wetlands: A Survey*. Beijer Discussion Paper No 54, Beijer

International Institute of Ecological Economics, The Royal Swedish Academy of Sciences: Stockholm. 41 pp. ISBN 1102-4941

There is world-wide growing concern about the conversion of wetlands into other land uses. One reason for this is that the total costs of wetland conversion are not taken into account. This paper presents a framework for the economic valuation of wetland services, which serves as the basis for a survey of 30 valuation studies in different regions. According to the survey there is a difference between regions in the focus of the wetland services subjected to valuation, and a minor variation in the choice of methods used for estimating values.

**Coverage:** Global, North America, Europe, Africa, Asia, Caribbean, Australia and New Zealand

**Contains examples or case studies from:** USA, Sweden, UK, Austria, Italy

**Ecosystem or sector focus:** Wetlands, Water

**Topics:** Valuation

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**#91.** Grey, F., (1998), *Estimating Values for Australia's Native Forests*. Environmental Economics Research Paper No 4, Department of the Environment, Sport and Territories: Canberra. 68 pp. ISBN 0 642 24863 X

This document describes how various reports have suggested that non-financial values should be given weight alongside financial values, and describes the process by which forest values can be given full consideration.

**Coverage:** Australia and New Zealand

**Contains examples or case studies from:** Australia

**Ecosystem or sector focus:** Forests

**Topics:** Valuation

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**#92.** Grigalunas, T. A., & Congar, R., (1995), *Environmental Economics for Integrated Coastal Area Management: Valuation Methods and Policy Instruments*. Regional Seas Reports and Studies No. 164, United



Nations Environment Programme: Nairobi. 165 pp. ISBN 92-807-1488-0

The importance of environmental issues in development has received increased international recognition over recent years. In environmental economics major efforts are underway to integrate environmental costs and benefits into economic analysis. This document provides a series of background reference materials on the application of environmental economics tools to marine and coastal environments. It defines economic concepts and looks at the economic analysis of environmental degradation. The document also describes key economic valuation methods and works through their application. It describes a number of economic policy instruments that can be used to improve environmental management in marine and coastal areas.

**Coverage:** Global

**Ecosystem or sector focus:** Marine and coastal

**Topics:** Valuation, Economic instruments, Incentive measures, Economic policies, Economic planning, Causes of biodiversity loss, Travel cost, Contingent valuation, Effect on production, Mitigative and avertive expenditures

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**#93.** Grimes, A., Loomis, S., Jahnige, P., Burnham, M., Onthank, K., Alarcon, R., Cuenca, W. P., Martinez, C. C., Neill, D., Balick, M., Bennet, B., & Mendelsohn, R. (1994). 'Valuing the Rainforest: The Economic Value of Non-timber Forest Products in Ecuador', *Ambio* 23 (7):405-410 pp

This paper reports on a study carried out to calculate the economic value of 3 hectares of primary forest in the Upper Napo region of Amazonian Ecuador, based on the potential extraction of non-timber forest products. Through ethnobotanical and market surveys, the annual harvested levels, market prices and extraction costs of seven fruits, three medicinal barks and one resin are measured. These values are significantly higher than the returns from alternative land uses in this area.

**Coverage:** Latin America

**Contains examples or case studies from:** Ecuador

**Ecosystem or sector focus:** Forests

**Topics:** Valuation, Market valuation

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**#94.** Gupta, A. K., (1996), *Incentives, Institutions and Innovations: Golden Triangle of Sustainable Conservation*. Paper presented at a workshop on Incentives for Biodiversity: Sharing Experiences, 4th Global Biodiversity Forum, Montreal, Canada 30 August - 1 September 1996. 6 pp.

<http://www.biodiversityeconomics.org>

Based on information from the Honey Bee Network in India, this paper advocates the development of institutional support for incentives to meet the objectives of sustainable conservation. It divides various kinds of incentives under the following four categories: 1) Material - individual: The incentives for conserving such biodiversity could be in material form and for individual use. The author gives examples such as A) Patent information system at decentralised level to promote participation of small scale sector in new ventures; B) To develop low cost decentralised system of registration of innovations/ inventions; C) Public watchdog committees to monitor and ensure sustainable extraction of biodiversity. 2) Material - collective: Here the author identifies four kinds of incentives which could be designed to promote creativity and innovation in conservation of biodiversity such as: a) venture capital support, b) risk cover through insurance, guarantee and risk funds, c) trust funds with or without individual leadership, and d) infrastructural development in the economically disadvantaged biodiversity rich regions. 3) Non-material - individual: Under this heading the author discusses incentives such as respect and recognition. 4) Non-material collective: The changes in curriculum and pedagogy are one of the most important candidates for consideration. Moreover policy changes in the regulatory as well as managerial systems is another way in which incentives can be generated for various local communities.

**Coverage:** Asia

**Contains examples or case studies from:** India

**Topics:** Incentive measures, Financial mechanisms, Trust Funds

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**#95.** Hamilton, K. (1994). 'Green adjustments to GDP', *Resources Policy* 20 (3):155-168

A review of the green national accounts literature shows that there is little agreement on whether to adjust gross or net product, or on the size of some of the adjustments proposed. A series of models is presented to examine the treatment in national accounts of living resources, heterogeneous resource deposits, resource discoveries, environmental services, carbon emissions and defensive expenditures by households. A key conclusion is that expanding the accounts to include non-market environmental services result in a measure of welfare rather than product, and that the level of environmental services is an integral component of this welfare measure. These results are compared with standard national accounts. Greener measures of wealth per capita and savings rates will have more policy relevance on gauging progress towards sustainable development than adjustments to national product,

**Coverage:** Global

**Topics:** Environmental accounting, Valuation

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**#96.** Hecht, J. E., & Orlando, B. (1998). 'Can the Kyoto Protocol Support Biodiversity Conservation? Legal and Financial Challenges', *Environmental Law Reporter* September:20 pp

This paper addresses the use of terrestrial ecosystems to absorb carbon. It questions whether this will create incentives and financial mechanisms for more effective and sustainable management of forests and associated biodiversity, and looks at legal and financial issues that need to be resolved in this context. It provides background on the place of forests in the carbon cycle, and the forest-related provisions of the Kyoto Protocol. It then considers five issues that will arise regarding the impacts of the Protocol - (1) unresolved issues among the forest provisions of the Protocol, (2) externalities (such as biodiversity and watershed protection) that may be associated with the implementation of forest provisions of the Protocol, (3) risks associated with carbon sequestration projects, (4) financial mechanisms that may help to reduce those risks, (5) the possible role of forests in emissions permits trading systems.

**Coverage:** Global

**Ecosystem or sector focus:** Forests, Agriculture

**Topics:** Climate change, Financial mechanisms, Convention on Biological Diversity, UN Framework Convention on Climate Change, Economic instruments, Land degradation, Deforestation, Incentive measures, Markets and charges, Carbon offsets

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**#97.** Higgins, S. I., Turpie, J., Costanza, R., Cowling, R. M., Le Maitre, D. C., Marais, C., & Midgeley, G. F. (1997). 'An ecological economic simulation model of mountain fynbos ecosystems: dynamics, valuation and management', *Ecological Economics* 22 (2):155-169

Mountain fynbos ecosystems in South Africa are threatened by alien plant invasions and by a lack of funding for effective management of these invasions. This paper develops an ecological-economic argument for the effective management of plant invasions in mountain fynbos ecosystems. This is done by building a dynamic ecological economic model which values the ecosystem services that fynbos ecosystems provide under different management systems. It is proposed that the services that mountain fynbos ecosystems provide fall into six components: water production, wildflower harvest, hiker visitation, ecotourist visitation, endemic species and genetic storage. A scenario analysis based on a hypothetical 4 square kilometre mountain fynbos ecosystem in the western part of the fynbos biome estimated that the ecosystem's value varies from R19 million to R300 million (R4.50=US\$1). Water production and genetic storage were the most valuable ecosystem services. The model showed that the cost of clearing alien plants was a tiny (0.5-5%) proportion of the value of mountain fynbos ecosystems. This result motivates an injection of funds for clearing alien plants from mountain fynbos ecosystems.

**Coverage:** Africa

**Contains examples or case studies from:** South Africa

**Ecosystem or sector focus:** Mountains, Tourism, Water

**Topics:** Valuation

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**#98.** Howard, P., (1996), *The Opportunity Costs of Protected Areas in Uganda*. Paper presented at IUCN Workshop on Economics of

Biodiversity Loss, April 1996, Gland, Switzerland. 14 pp.

<http://www.biodiversityeconomics.org>

This paper's aim is to assess in financial terms the opportunity cost of excluding human settlement, cultivation and pastoral activities from Uganda's National Parks, Game Reserves and Forest Reserves. These protected areas represent 16.7% of the country's land area. Increasing demographic, economic and associated political pressures are pushing for the opening of these lands for agro-pastoral use. The analysis of the opportunity cost is composed of six stages: first, the assessment of the land under cultivation; second, the assessment of the land area under protection; third, assessment of the land area available for livestock; fourth, the estimation of land values under cultivation; fifth, the estimation of land values under livestock; and finally, calculation of the potential value of protected area land under agro-pastoral development. The result of the analysis is that the total opportunity cost of maintaining Uganda's protected areas amounts to an estimated US\$110 million/yr. This number exceeds the gross revenues of the protected area system by 100 times. Thus, the conversion to agro-pastoral use would be financially preferable to maintaining the status quo. The lesson in terms of biodiversity conservation is that incentive measures are necessary to make such preservation worthwhile in economic terms.

**Coverage:** Africa

**Contains examples or case studies**

**from:** Uganda

**Ecosystem or sector focus:** Protected Areas, Forests, Wildlife

**Topics:** Causes of biodiversity loss, Valuation, Economic instruments

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**#99.** Huber, R. M., Ruitenbeek, J., & Seroa da Motta, R., (1998), *Market Based Instruments for Environmental Policymaking in Latin America and the Caribbean: Lessons from Eleven Countries*. Work in Progress for Public Discussion, Discussion Paper No. 381, World Bank: Washington DC. 79 pp.

One of the greatest challenges facing developing countries is to enhance growth while finding the most cost-effective way to reduce negative environmental impacts. This document shows how traditional "command and control"

approaches can be improved upon by the use of broad-based market instruments that provide economic incentives for changed behaviour. It reports on a study of market-based instruments carried out in 11 countries in Latin America and the Caribbean.

**Coverage:** Latin America, Caribbean

**Contains examples or case studies**

**from:** Bolivia, Brazil, Chile, Colombia, Ecuador, Jamaica, Mexico, Peru, Venezuela

**Topics:** Economic instruments, Economic policies, Causes of biodiversity loss, Taxes, Pollution, Subsidies, Incentive measures, Financial mechanisms

**Other:** Executive summary also published in Spanish.

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**#100.** Hunt, C., (1997), *Economic Instruments for Environmental and Natural Resource Conservation and Management in the South Pacific*. Working Paper in Ecological Economics No 9706, Centre for Resource and Environmental Studies, Australian National University: Canberra. 57 pp.

Trends in natural resource exploitation and consumption patterns have increased the need for resource conservation and pollution control in the South Pacific. The need for greater government resources, implied by the intensification of environmental management, has coincided with budgetary restraints in the South Pacific that have often been severe. Economic (as opposed to command and control) instruments are of increasing interest because they possess the potential to shift from government to producers or consumers the onus to comply with environmental measures. In this paper, argument about the applicability of economic instruments in conservation and management in developing countries in general and the South Pacific in particular, is prefaced by a brief exposition of the theory and a description of the types of instruments. An analysis of some twenty case studies in the South Pacific enables some conclusions to be drawn about the conditions necessary for the application of economic instruments and enables some recommendations to be made about their adoption.

**Coverage:** Australia and New Zealand, Pacific

**Contains examples or case studies**

**from:** Australia, Fiji, Papua New Guinea, Kiribati, Solomon Islands, Tuvalu, Micronesia, Vanuatu, New Zealand

**Ecosystem or sector focus:** Marine and coastal, Urban settlements, Industry, Infrastructure

**Topics:** Economic instruments, Bonds and deposits, Markets and charges, Property rights, Financial mechanisms, Trust Funds

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**#101.** Hussain, A., & Arif, T., (1998), *Local Examples of Financial Innovation*. Paper presented at a workshop on Financial Innovations to Combat Desertification 12 th Global Biodiversity Forum, Dakar, Senegal, 4-6 December 1998. 3 pp.

<http://www.biodiversityeconomics.org>

UN Convention on Combating Desertification provides a good opportunity for development in the marginal drylands to address problems of drought, land degradation and degradation of social and physical infrastructure. The challenge is how to mobilise financial resources to initiate local area development programmes in the remote marginal areas, away from markets, infrastructure and formal banking and financial systems. Funding is largely out of reach of communities. Even after establishment of instruments like national desertification funds, it is unlikely for the community groups to approach the money easily for implementing projects. This paper documents experiences in Pakistan.

**Coverage:** Asia

**Contains examples or case studies**

**from:** Pakistan

**Ecosystem or sector focus:** Drylands

**Topics:** Financial mechanisms, Convention on Combating Desertification

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**#102.** Huston, M. (1993). 'Biological diversity, soils and economics', *Science* 262:1676-1680

Terrestrial biological diversity is supported by solar energy captured by plants growing in soil. This soil-based plant productivity also provides the foundation for human societies through production of food and renewable forms of energy. Variations in plant productivity, resulting from differences in inherent soil fertility,

variations in climate and weather, and differences in chemical inputs and agricultural practices, produce patterns of biodiversity that are associated with the agricultural component of economic productivity. Ecological processes lead to a generally negative relation between the diversity of plant species and potential agricultural productivity at both local and global scales. One implication of this negative relation is that the preservation of areas of high plant biodiversity does not require the sacrifice of productive agricultural lands.

**Coverage:** Global

**Ecosystem or sector focus:** Agriculture

**Topics:** Valuation, Causes of biodiversity loss

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**#103.** IIED, (1997), *Valuing the Hidden Harvest: Methodological Approaches for Local-Level Analysis of Wild Resources*. Sustainable Agriculture and Environmental Economics Programmes, Research Series Volume 3 No 4, International Institute for Environment and Development: London. 71 pp. ISBN 1358-3775

There is a growing interest in the role of wild resources in local livelihoods. Yet many natural resource policies fail to consider their full economic benefits. Whose knowledge and whose valuations count when conducting economic assessments? In many cases economic analyses are made on the basis of limited, highly aggregated data and with limited insight into local level perspectives. This paper suggests some methodological alternatives and presents case studies of the local-level economic analysis of wild resources.

**Coverage:** Global, Africa, Latin America, Pacific

**Contains examples or case studies**

**from:** Botswana, Brazil, Zimbabwe, Nigeria, Papua New Guinea

**Ecosystem or sector focus:** Agriculture, Forests, Wildlife

**Topics:** Valuation, Incentive measures

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**#104.** Inamdar, A., & de Merode, E., (1999), *Towards Financial Sustainability for*



**Protected Areas: Learning from Business Approaches.** WWF-UK: Godalming. 56 pp.

This is a practical guide to help managers improve the financial viability of protected area operations. It looks at basic tools and methods for financial management that are commonly used in the private sector, and assess their application to protected areas. Various case studies of this are provided. The manual looks at success factors associated with creating greater commercial awareness and provides lessons learned and best practices in improving the financial viability of protected areas.

**Coverage:** Global

**Ecosystem or sector focus:** Protected Areas

**Topics:** Financial mechanisms, Private sector, Markets and charges, Incentive measures

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**#105.** IUCN (Ed.), (1994), *Report of the First Global Forum on Environmental Funds.*

Proceedings of: Santa Cruz, Bolivia. 128 pp.  
ISBN 2-8317-0247-X

This document covers the background to National Environmental Funds, and the requirements for establishing and operating them. It also presents a series of profiles of different environmental funds from around the world.

**Coverage:** Global, Africa, Asia, North America, Latin America, Pacific, Europe

**Contains examples or case studies from:** Belize, Bhutan, Bolivia, Brazil, Chile, Colombia, Dominican Republic, El Salvador, Guatemala, Honduras, Indonesia, Jamaica, Mexico, Panama, Papua New Guinea, Peru, Philippines, Poland, Sri Lanka, Uganda

**Ecosystem or sector focus:** Forests, Wildlife, Protected Areas, Marine and coastal

**Topics:** Financial mechanisms, Economic instruments

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**#106.** James, A. N., Green, M. J. B., & Paine, J. R., (1996), *Financial Indicators for Biodiversity Assessment: In Situ Conservation Investments.* Paper presented at a workshop on Investing in Biodiversity, 5th Global Biodiversity Forum, Buenos Aires,

Argentina, 1-3 Nov 1996. 20 pp.

<http://www.biodiversityeconomics.org>

Drawing upon the results of a three year project at the World Conservation Monitoring Centre, this paper examines the issues involved in the compilation and analysis of financial indicators for the assessment of in situ biodiversity conservation at the national level. An overview of the existing data on financial indicators and targets for in situ conservation are presented, including the recently completed global survey of governmental budgets for protected areas by the WCMC. The paper then discusses the methodological issues involved in standardising data on investment in biological diversity conservation, the determination of standards for judging the adequacy of investment, and ways to improve the future collection of such information. The discussion is conducted within the framework of the upcoming national reports by the Parties of the Convention on Biological Diversity, and the specific objective of establishing financial indicators from the data included in the national reports.

**Coverage:** Global

**Ecosystem or sector focus:** Protected Areas

**Topics:** Financial mechanisms, Convention on Biological Diversity

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**#107.** James, R. F., (1991), *Wetland Valuation: Guidelines and Techniques.*

PHPA/AWB Sumatra Wetland Project Report No 31, Asian Wetland Bureau - Indonesia: Bogor. 160 pp.

This document has been prepared as a guide for those wishing to conduct economic valuation of wetlands. A number of key issues of concern when valuing natural areas are discussed briefly, and detailed guidelines on the application of a number of specific valuation techniques are presented. The document focuses mainly on practical issues and methodologies.

**Coverage:** Global, Asia

**Contains examples or case studies from:** Nepal, USA, Fiji, Thailand, Korea, Philippines, Australia

**Ecosystem or sector focus:** Wetlands, Marine and coastal

**Topics:** Valuation

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**#108.** Janssen, R., & Padilla, J. E., (1996), *Valuation and Evaluation of Management Alternatives for the Pagbilao Mangrove Forest*. CREED Working Paper No 9, International Institute for Environment and Development: London. 47 pp.

Mangrove swamps are rapidly declining in many parts of the world. This has resulted in the loss of important economic and environmental functions and products. One of the major threats to mangroves in the Philippines is the rapidly increasing aquaculture industry. The aim of this paper is to demonstrate the use of results obtained from the valuation of mangroves in Pagbilao to support an evaluation of alternative management strategies. It concludes that if economic efficiency is maximised, conversion to aquaculture is the preferred alternative. However if equity and sustainability objectives are included than commercial forestry is the preferred alternative.

**Coverage:** Asia

**Contains examples or case studies from:** Philippines

**Ecosystem or sector focus:** Marine and coastal, Wetlands, Fisheries

**Topics:** Valuation

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**#109.** Joshi, M., (1999), *Financing Sustainable Forestry: Issues Under International Deliberation*. Programme on Forests, United Nations Development Programme: New York. 46 pp.

This background document was produced to facilitate discussion on matters left pending on financing needs at the Third Session of the Intergovernmental Forum on Forests. It presents a review of financial and economic aspects of sustainable forest management.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Financial mechanisms, Economic instruments, Trust Funds, Debt conversion, Carbon offsets

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**#110.** Juma, C., Monteith, H., Krugmann, H., Angura, T., Acquay, H., Akinlo, A. E., Wandera, P., & Mugabe, J. (Eds.), (1995), *Economic Policy Reforms and the Environment: African Experiences*. Environment and Trade Series, United Nations Environment Programme: Geneva. 214 pp. ISBN 1020-1610

This book examines the relationship between trade and the environment, focusing especially on the trade implications of domestic and international environmental measures, including possible trade distortionary effects of environmental measures, and on the environmental effects of trade liberalisation. It examines African perspectives on structural adjustment and sustainable development, and outlines a number of country case studies which analyse the links between macroeconomic and trade policy and the environment in different sectors.

**Coverage:** Africa

**Contains examples or case studies from:** Kenya, Uganda, Nigeria, Ghana

**Ecosystem or sector focus:** Wildlife, Protected Areas, Forests, Industry

**Topics:** Economic instruments, Economic policies, Trade, Taxes, Subsidies, Causes of biodiversity loss, Disincentives

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**#111.** Kaiser, J., & Lambert, A., (1996), *Debt Swaps for Sustainable Development*. IUCN - The World Conservation Union: Gland. ISBN 2-8317-0362-X

This handbook describes how debt conversions can be implemented, using practical examples and case studies from around the world. It deal especially with debt swaps designed for sustainable development. The main conclusions offered in the handbook are that debt conversion is much less complicated in practice than it appears in theory, that there is no single "recipe" for all debt swaps, and that debt swaps often required a joint initiative of NGOs in both the debtor and the creditor country.

**Coverage:** Global

**Contains examples or case studies from:** Zambia, Philippines, Mexico

**Topics:** Financial mechanisms, Economic instruments, Economic policies, Economic policies, Private sector, Incentive measures, Debt conversion, Trust Funds

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**#112.** Kramer, R. A., (1994), *Cost and Compensation Issues in Protecting Tropical Rainforests: Case Study of Madagascar*.

Environment Working Paper No 62, the World Bank Environment Department Africa Technical Department: Washington DC. 32 pp.

Development projects for protecting rainforests and other ecologically important ecosystems often have considerable impacts on local residents. This study examines the cost to villagers of establishing the Mantadia National Park in the eastern rainforest of Madagascar. Two methods are used to estimate economic impacts on villagers: opportunity costs based on household cashflow models, and contingent valuation analysis based on direct questioning. The study concludes that compensation costs appear to be a significant part of the full costs of implementing protected area projects and should be built into project design from an early stage.

**Coverage:** Africa

**Contains examples or case studies from:** Madagascar

**Ecosystem or sector focus:** Forests, Protected Areas, Wildlife

**Topics:** Valuation, Economic policies, Economic instruments, Market valuation, Contingent valuation

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**#113.** Kramer, R. A. (1997). 'Valuing a global environmental good: US residents' willingness to pay to protect tropical rain forests', *Land Economics* 73:196-210

Although contingent valuation (CV) is the most common technique for valuing non-market environmental resources, rarely has it been applied to global environmental goods. This study uses CV in a national survey to assess the value US residents place on tropical rain forest protection. On average, respondents were willing to make a one-time payment of approximately \$21-31 per household to protect an additional 5 percent of tropical forests. Although respondents were able to give consistent responses across two different CV formats, focus groups were

unwilling or unable to allocate their aggregate rainforest valuations across or among regions or specific rain forests.

**Coverage:** Global  
North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Forests, Tourism

**Topics:** Valuation, Contingent valuation, Financial mechanisms, Causes of biodiversity loss

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**#114.** Kramer, R. A., Richter, D. D., Pattanayak, S., & Sharma, N. P. (1997). 'Ecological and economic analysis of watershed protection in Eastern Madagascar', *Journal of Environmental Management* 49:277-295

Watershed protection is one of the many goods and services provided by the world's tropical forests. Flood damage alleviation is a particularly important component of this service. This study attempts to measure flooding alleviation benefits resulting from the protection of upland forests in Eastern Madagascar and to examine the relationships between the economic concept of value and the bio-physical dimensions of the protected area. The results of this analysis should help policy makers assess the trade-offs between the costs and benefits of protecting tropical rainforest.

**Coverage:** Africa

**Contains examples or case studies from:** Madagascar

**Ecosystem or sector focus:** Forests, Watersheds, Wetlands, Wildlife, Protected Areas

**Topics:** Valuation

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**#115.** Kremen, C., Niles, J., Dalton, M., Daily, G., Ehrlich, P., Fay, J., Grewal, D., & Guillery, R. (2000). 'Incentives for Rain Forest Conservation Across Scales', *Science* 288:1828-1832

Globally, tropical deforestation releases 20 – 30% of anthropogenic greenhouse gases. Conserving forests could reduce emissions, but the cost-effectiveness of this mechanism for mitigation depends on the associated opportunity costs. We estimated these costs from local, national, and global perspectives using a case study from

Madagascar. Conservation generated significant benefits over logging and agriculture locally and globally. Nationally, however, financial benefits from industrial logging were larger than conservation benefits. Such different economic signals across scales may exacerbate tropical deforestation. The Kyoto Protocol could potentially overcome this obstacle to conservation by creating markets for protection of tropical forests to mitigate climate change

**Coverage:** Africa

**Contains examples or case studies from:** Madagascar

**Ecosystem or sector focus:** Forests

**Topics:** Economic instruments, Causes of biodiversity loss, Climate change

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**#116.** Kumar, R., & Young, C., (1996), *Economic Policies for Sustainable Water Use in Thailand*. CREED Working Paper No 4, International Institute for Environment and Development: London. 33 pp.

The objective of this paper is to illustrate how the Social Accounting Matrix of Thailand may be extended to incorporate water resources, and to give examples of what they supply and demand functions of water would look like. The discussion focuses on pricing and on demand and supply equations that reflect the true scarcity of water for different users and from different sources.

**Coverage:** Asia

**Contains examples or case studies from:** Thailand

**Ecosystem or sector focus:** Water, Wetlands, Agriculture, Watersheds, Industry, Infrastructure, Urban settlements

**Topics:** Valuation, Economic policies, Economic instruments

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**#117.** Lake, R., (1996), *Financial Resources for Biodiversity Conservation in Developing Countries: Indicators and Targets for Donor Country Financial Assistance*. Paper presented at a workshop on Investing in Biodiversity, 5th Global Biodiversity

Forum, Buenos Aires, Argentina, 1-3 Nov 1996. 7 pp. <http://www.biodiversityeconomics.org>

This paper evaluates whether funds being provided by developed countries for biodiversity conservation in developing countries represent "new and additional resources", as required by Agenda 21 and the Convention on Biological Diversity (CBD). The paper assumes that resources should be "new and additional" in relation to historical levels of both aid for biodiversity and total aid before the signature of the CBD and the agreement of Agenda 21 in 1992. It examines biodiversity spending by the Global Environment Facility and other bilateral and multilateral donors; aid for sectors relevant to biodiversity conservation, such as agriculture, forestry and the integration of the environment into decision-making; total aid flow; debt; and structural adjustment. It also summarises estimates of the cost of biodiversity conservation in developing countries. Information on developing countries' expenditure of their own resources on conservation is provided to illustrate the scale of the current funding shortfall. The challenge of global biodiversity conservation requires that donors fulfil their legal and political obligations to provide new and additional financing. As part of this, the GEF should be replenished at a level substantially higher in real terms than the \$ 2 billion pledged for 1994-1997.

**Coverage:** Global

**Topics:** Financial mechanisms, Convention on Biological Diversity

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**#118.** Leclerc, A., (1996), *Generating Income in Your Backyard: A Worthy Approach to Financing Biodiversity*. Paper presented at a workshop on Investing in Biodiversity, 5th Global Biodiversity Forum, Buenos Aires, Argentina, 1-3 Nov 1996. 7 pp. <http://www.biodiversityeconomics.org>

While local revenue generation cannot be expected to always raise the millions required to set up vast protection programs, it can at times provide the operations money for changing a paper park into a real operational protected area, or a desirable conservation concept into an applied regulation or specific program for sustainable use. This however, calls for innovative thinking, and for carefully designed applications of the "user/benefactor pay" and "cost recovery" principles. It also calls for perceiving the private sector as a partner of sort and not as an enemy,

neither as an almighty driver as is sometimes the case with the tourism industry in protected areas. In addition, it can mean that Environmental Non-Governmental Organisations (ENGOS) should become learned about, and involved with, the above. This may enable them to suggest the viable fiscal solutions when recommending new governmental initiatives/programs. In doing so, ENGOS can more efficiently attempt to defuse the financial questions before they are even posed. The paper addresses issues such as: a) user fees and other forms of revenue generation for parks - including partnership with the tourism sector, b) user fees for other governmental conservation programs (with examples/cases from the review of potential cost recovery for Environment Canada - this study has permitted to identify a number of areas with significant cost recovery potential), and c) on the risks of poorly designed/applied revenue generation programs, d) the dangers with unpredictable public/media perception and reaction, e) the potentially significant management related side benefits which includes cost recovery and local revenue generation.

**Coverage:** North America

**Contains examples or case studies from:** Canada

**Ecosystem or sector focus:** Protected Areas, Tourism

**Topics:** Financial mechanisms, Taxes, Markets and charges, Private sector

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**#119.** Lee, H.-D. (1998). 'Use and value of coastal wetlands in Korea', *Intercoast Network* 32:7-8

This article looks at the productivity values of coastal wetlands in Korea, including fisheries, habitat functions, waste treatment services and aesthetic functions. It concludes that economic valuation has an important role in contributing to well-informed policy decisions.

**Coverage:** Asia

**Contains examples or case studies from:** Korea

**Ecosystem or sector focus:** Marine and coastal, Wetlands

**Topics:** Valuation

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**#120.** Lintott, J. (1996). 'Environmental accounting: useful to whom and for what?', *Ecological Economics* 16:179-190

The development of statistics can only be understood in relation to their particular uses. Proposals to integrate environmental costs and benefits into national accounts can only be evaluated by considering them in the context of their likely policy use. Their most important potential use is as a measure of welfare or progress. Environmentally adjusted national accounts correspond to a very weak view of sustainability. The use of environmental accounts as a measure of welfare assumes a complete substitutability between manufactured and natural capital. Problems of monetary undervaluation are likely to lead to a huge underestimation of environmental costs. Issues of poverty and inequality are ignored. Policy targeting a revised national income will continue to aim for ever higher output while making very limited concessions to environmental concerns. An alternative approach to allowing for environmental costs in policy making is the construction and use of a set of social and environmental indicators.

**Coverage:** Global

**Topics:** Valuation, Environmental accounting, Economic policies

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**#121.** London Economics, (1992), *Economic Costs of Carbon Dioxide Reduction Strategies*. Working Paper Series No III, Global Environment Facility: Washington DC. 60 pp.

Over the last 5 years the problem of global warming has become one of the world's chief environmental priorities. This paper considers the relevant economics of pollution control as applied to carbon dioxide. The complexity of the policy framework is explored, and policy options explored. Empirical evidence on the costs of carbon dioxide abatement are presented, and major sub-sectors such as electric power and transport are examined. The document concludes by proposing an approach for developing a least-cost national strategy for carbon dioxide abatement.

**Coverage:** Global

**Ecosystem or sector focus:** Forests, Industry

**Topics:** Pollution, Climate change, Carbon offsets, Economic instruments, Economic policies

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**#122.** Lonergan, S., & Ruitenbeek, J. (1994). 'Applications of ecological economics in developing countries', *Ecological Economics* 11 (2):91-161

This special issue contains five papers which provide an insight into how ecological economics is being applied in selected developing countries. The first two papers are written from a macro-level perspective, providing a state-of-the-art example of sustainable income accounting in Zimbabwe and an account of sustainable approaches to agricultural production in sub-Saharan farming systems. The following three papers are presented from a more sectoral perspective. In turn they address: the problem of setting compensation levels in the wake of forest conservation programmes in Brazil; applications of valuation methods to policies for improving wildlife conservation in Kenya's national parks; and the importance of decentralised participation in tsetse fly control programmes in Ethiopia.

**Coverage:** Global, Africa, Latin America

**Contains examples or case studies from:** Kenya, Brazil, Zimbabwe, Ethiopia

**Ecosystem or sector focus:** Agriculture, Forests, Wildlife, Protected Areas

**Topics:** Economic policies, Economic instruments, Environmental accounting, Valuation

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**#123.** Loureiro, W., & de Moura, R. P. R., (1996), *Ecological ICMS (Tax Over Circulation of Goods and Services): A Successful Experience in Brazil*. Paper presented at workshop on Incentives for Biodiversity: Sharing Experiences, 4th Global Biodiversity Forum, Montreal, Canada 30 August - 1 September 1996. 4 pp.

<http://www.biodiversityeconomics.org>

This paper summarises changes in Brazilian tax laws so that biodiversity conservation is rewarded instead of penalised. The changes have resulted in an increased area of conservation, improved quality of conservation areas, and municipalities

have witnessed an increase in revenues which help with the protection of sensitive areas. The paper recommends that fiscal compensation for land use restrictions should be developed to foster local commitment to protected areas.

**Coverage:** Latin America

**Contains examples or case studies from:** Brazil

**Ecosystem or sector focus:** Forests, Protected Areas

**Topics:** Private sector, Taxes, Financial mechanisms, Incentive measures, Economic instruments

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**#124.** Maler, K.-G. (1991). 'National accounts and environmental resources', *Environmental and Resource Economics* 1:1-15

In this paper, optimal growth theory is used to derive the appropriate definition of the net national product concept, when there are environmental resources and environmental damage to take into account. The basic conclusions are that conventionally defined NP should be corrected by deducting environmental damage and adding the value of the net change of all resources.

**Coverage:** Global

**Topics:** Environmental accounting, Valuation, Economic policies

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**#125.** Maler, K.-G., Aniyar, S., Casler, C., & Weir, E., (1997), *The Economics of Coastal Wetlands*. Beijer Discussion Paper No 94, Beijer International Institute of Ecological Economics, The Royal Swedish Academy of Sciences: Stockholm. 25 pp. ISBN 1102-4941

This paper presents an approach to estimating the value of the services provided by mangrove forests, and by those in Los Olivitos, Venezuela in particular.

**Coverage:** Global  
Latin America

**Contains examples or case studies from:** Venezuela

**Ecosystem or sector focus:** Wetlands, Marine and coastal



**Topics:** Valuation

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**#126.** Markandya, A., & Perrings, C., (1991), *Resource Accounting for Sustainable Development: A Review of Basic Concepts, Recent Debate and Future Needs*. LEEC Paper DP 91-06, London Environmental Economics Centre: London. 53 pp.

Environmental accounting is motivated by a desire to bring environmental issues at the centre of the development debate. It tries to monitor the environmental impacts of economic activity, and to develop a set of indicators of these impacts in an integrated fashion, so that policy makers are better informed about environmental issues. This paper looks at the background to environmental valuation and indicators, and explains the methods and techniques for constructing environment accounting systems. It illustrates this with examples from forestry and wildlife sectors, and from Botswana and Indonesia.

**Coverage:** Global, Africa, Asia

**Contains examples or case studies from:** Botswana, Indonesia

**Ecosystem or sector focus:** Forests, Agriculture

**Topics:** Valuation, Environmental accounting, Economic instruments, Economic policies, Trade

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**#127.** Markandya, A., & Richardson, J. (Eds.), (1992), *The Earthscan Reader in Environmental Economics*. Earthscan Publications Ltd: London. 469 pp. ISBN 1-85383-106-9

This reader is a sourcebook that brings together the most important contributions to the literature on environmental and natural resource economics. It covers the theoretical issues, the different ways of valuing the environment, economic instruments of environmental policy, environment and development, and global environmental problems. An extensive introduction is provided which maps out the area of environmental economics and the different approaches to it.

**Coverage:** Global, North America, Latin America

**Contains examples or case studies from:** USA, El Salvador, Costa Rica

**Ecosystem or sector focus:** Wildlife, Fisheries, Industry

**Topics:** Valuation, Economic instruments, Economic policies, Trade, Incentive measures, Disincentives, Pollution, Taxes, Subsidies

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**#128.** McNeely, J., (1988), *Economics and Biological Diversity: Developing and Using Economic Instruments to Conserve Biological Diversity*. IUCN - The World Conservation Union: Gland. 232 pp. ISBN 2-88032-964-7

Current processes of development are depleting many biological resources at such a rate that they are rendered essentially non-renewable. Effective government intervention is needed to meet the needs of society, because experience has shown that too little biological diversity will be conserved by market forces alone. Economic inducements are likely to prove an effective measure for converting over-exploitation to sustainable use of biological resources. This book looks at the background and application of economic incentives for biodiversity conservation. It examines the economic costs and benefits of biological diversity, describes what economic incentives are and provides an overview and examples of the use of economic incentives at community, national and international levels. It also describes mechanisms for funding incentive packages, and presents guidelines for using incentives.

**Coverage:** Global, Europe, North America, Asia, Africa, Latin America, Caribbean

**Contains examples or case studies from:** Brazil, Botswana, Indonesia, Thailand, Zimbabwe, Nepal, Kenya, Mexico, China, Mali, Honduras, Japan, Philippines, Costa Rica, India, Zambia, USA

**Ecosystem or sector focus:** Forests, Wildlife, Protected Areas, Wetlands, Marine and coastal, Drylands, Watersheds, Industry

**Topics:** Trade  
Incentive measures, Causes of biodiversity loss, Economic instruments, Disincentives, Economic policies, Financial mechanisms, Valuation

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**#129.** McNeely, J. (1989). 'How to pay for conserving biological diversity', *Ambio* 18 (6):308-313

This article looks at ways of addressing the difficulty of raising sufficient finance for biodiversity conservation. Using case studies from around the world, it illustrates innovations in biodiversity funding and makes conclusions about the broader policy and institutional conditions that are necessary to ensure that conservation is properly financed.

**Coverage:** Global, Africa, Asia, Latin America

**Contains examples or case studies**

**from:** Costa Rica, Venezuela, Ecuador, Thailand, Cote d'Ivoire, USA, Sri Lanka, Zambia, Zimbabwe, Nepal

**Ecosystem or sector focus:** Forests, Protected Areas, Marine and coastal, Water

**Topics:** Financial mechanisms, Incentive measures, Economic instruments, Debt conversion, Payments for environmental services, Trust Funds

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**#130.** McNeely, J., (1999), *Achieving Financial Sustainability in Biodiversity Conservation Programmes*. A framework paper prepared for presentation at an Inter American Development Bank Workshop on Investing in Biodiversity Conservation, Washington D.C., on the 28 th October 1996. 58 pp. <http://www.biodiversityeconomics.org>

It is widely appreciated that insufficient investment is being made in conserving biodiversity, and that innovative approaches are required for generating the additional financial support required for implementing the Convention on Biological Diversity. The need for additional resources arises from the imbalance between a country's need for capacity building and provision of basic infrastructure for conserving biodiversity on the one hand, and the ability of the country to mobilise resources on the other. This paper surveys the current situation, present trends, and promising innovations in the financing of biodiversity conservation. It describes each promising financial tool and the policies, technologies, and entrepreneurial initiatives required to make the tool successful. It estimates the importance of each tool, describes limits to its wider use, and identifies actions that could enhance that tool's leverage. It emphasises innovative tools that are relatively poorly known. This paper seeks to help the widest range of investors who could (and should) have a hand in crafting and using these tools. They include the

full spectrum of those active, and potentially active, in biodiversity conservation: the international governing system; national governments; the private sector, both national and multinational; and NGOs, both local and international.

**Coverage:** Global

**Topics:** Financial mechanisms, Incentive measures, Economic instruments

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**#131.** Mendelsohn, R., & Balick, M. (1995). 'The value of undiscovered pharmaceuticals in tropical forests', *Economic Botany* 49 (2):223-228

Previous estimates of the potential value of higher plants in tropical forests for pharmaceuticals are too high because analysts mistakenly used gross revenues to value drugs instead of net revenues. Correcting this error, the article estimates that each new drug is worth an average of US\$ 94 million to a private drug company and US\$ 449 million to society as a whole. Given recent experience searching for new drugs, it is estimated that the higher plants of the world's tropical forests contain about 375 potential pharmaceuticals of which 48 (about one in eight) have already been discovered. Multiplying these values by the number of potential new drugs suggests that a complete collection and screening of all tropical plant species should be worth about US\$ 3-4 billion to a private pharmaceutical company, and as much as US\$ 147 billion to society as a whole.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Valuation, Bioprospecting

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**#132.** Merrifield, J. (1996). 'A market approach to conserving biodiversity', *Ecological Economics* 16:217-226

The policy used to implement the Endangered Species Act only prohibits actions that are harmful to listed species. While doing far too little to advance the cause of biodiversity, such prohibitions, or the prospect of them, seem to be imposing significant costs on many regional economies, and much greater impacts are feared. The article describes a market mechanism for simultaneously internalising the social cost of eliminating especially scarce habitat, and the social

benefits of protecting or producing it. For landowners with low value non-habitat uses, the market mechanism transforms habitat from a major liability into a money-making asset. For landowners with high value non-habitat uses, the market mechanism would be a very attractive alternative to the current slow and expensive case-by-case consultation process. Environmentalists will appreciate the market process because it is less subject to politicisation, or being gutted budgetarily or administratively, while assuring that agreed-upon, safe biological minimums cannot be violated.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Wildlife, Fisheries, Agriculture, Protected Areas, Forests

**Topics:** Economic instruments, Incentive measures

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**#133.** Moran, D., (1994), *Contingent Valuation and Biodiversity Conservation in Kenyan Protected Areas*. Working Paper GEC 94-16, Centre for Social and Economic Research on the Global Environment: London. 28 pp.

The financial returns to Kenyan tourism demonstrate the importance of the country's tourist potential to economic development, and the role of wildlife protected areas in this. Yet there is little coincidence between those that benefit from protected areas and those that pay for their continued existence. Kenyans pay an implicit subsidy to support conservation for the benefit of the world at large. Using a contingent valuation survey, this study attempts to calculate the consumer surplus attached to the current non-consumptive use of protected areas by foreign tourists. This is more than double the opportunity cost of protected areas, and is additional to current financial returns from tourism. Recommendations are made that more of this consumer surplus could be captured through the current park entry fee structure.

**Coverage:** Africa

**Contains examples or case studies from:** Kenya

**Ecosystem or sector focus:** Wildlife, Protected Areas

**Topics:** Valuation, Contingent valuation, Economic instruments, Incentive measures, Markets and charges, Financial mechanisms

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**#134.** Munasinghe, M., & McNeely, J. (Eds.), (1994), *Protected Area Economics and Policy: Linking Conservation and Sustainable Development*. Proceedings of the Workshop on the Economics of Protected Areas at the IUCN-World Conservation Union Fourth Congress on National Parks and Protected Areas: Caracas, Venezuela. 364 pp. ISBN 0-8213-3132-9

This volume presents the papers presented at a Workshop on the Economics of Protected Areas at the IUCN-World Conservation Union Fourth Congress on National Parks and Protected Areas, held in Caracas Venezuela in 1992. They seek to bring the techniques of environmental economics to bear on the vital task of improving the design and management of protected areas.

**Coverage:** Global, Caribbean, Latin America, Africa, Asia, Australia and New Zealand, Pacific, Europe, North America

**Contains examples or case studies from:** Ghana, USA, Indonesia, Australia, Madagascar, Ecuador, UK, Canada, Nepal, Netherlands Antilles, Venezuela

**Ecosystem or sector focus:** Protected Areas, Marine and coastal, Forests, Drylands, Fisheries, Industry

**Topics:** Private sector, Valuation, Incentive measures, Economic instruments, Economic policies, Causes of biodiversity loss, Markets and charges, Financial mechanisms

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**#135.** Myers, N., (1996), *Perverse Subsidies*. Paper presented at IUCN Workshop on Economics of Biodiversity Loss, April 1996, Gland, Switzerland. 11 pp.  
<http://www.biodiversityeconomics.org>

The question asked in this paper is: which subsidies are detrimental to society's overall and long-term interests? Subsidies represent 3.8% of a global economy of \$26 trillion and therefore play a prime role in the functioning of the global economy. They can be detrimental, i.e. 'perverse.'

to society in the sense that they contribute to the destruction of the environment and the over-exploitation of natural resources. For example, agricultural subsidies can lead to over-loading of croplands and pollution from synthetic fertilisers and pesticides. The main problems associated with subsidies are that they are very expensive for governments and that they cause inefficiencies in production or the mis-use and over-use of resources. The case of subsidies for marine fisheries is studied in detail. All major marine fisheries are considered to be over-exploited and while world-wide harvest has increased almost fivefold since 1950, the catch has been declining since 1989. Subsidies, aimed at preserving the fishermen's jobs, aggravate the situation by allowing the fishing industry to continue over-exploiting the fisheries in spite of the declining annual catch. As a result, there is now an excessive extractive capacity in the fishing industry. Several policy responses are proposed, such as using the subsidies to retrain fishermen who are put out of work through reduced catches—whether reduced through declining stocks or through policy shifts. Another proposal is for governments to charge foreign fishermen for the right to catch off their shores. Finally, the solution proposed is that of a limited number of tradeable fishing rights to individual fishermen.

**Coverage:** Global

**Ecosystem or sector focus:** Agriculture, Forests, Fisheries, Marine and coastal

**Topics:** Incentive measures, Disincentives, Causes of biodiversity loss, Subsidies, Taxes

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**#136.** Navrud, S., & Mungatana, E. (1994). 'Environmental valuation in developing countries: the recreation value of wildlife viewing', *Ecological Economics* 11:135-151

Few environmental valuation studies have been carried out in developing countries. This study shows that the Travel Cost (TC) and the Contingent Valuation (CV) methods can be successfully applied to value natural resources in developing countries. These two independent methods were used to estimate the recreational value of wildlife viewing, which is a valid, but very conservative, estimate of the total economic value of the wildlife species. The annual recreational value of wildlife viewing in Lake Nakuru National Park in Kenya was found to be \$7.5-\$15 million. The flamingos accounted for more than one third of the value. Recognising that this is only one of

many parks in Kenya, and that wildlife viewing is becoming an important part of the global trend of increasing ecotourism, this shows that sustainable management of wildlife resources could provide a very significant and much needed revenue source for developing countries in the future. The challenge for the developing countries is to find ways to realise this economic potential, which also secures the preservation of wildlife.

**Coverage:** Africa

**Contains examples or case studies from:** Kenya

**Ecosystem or sector focus:** Wetlands, Wildlife, Protected Areas

**Topics:** Valuation, Travel cost, Contingent valuation, Financial mechanisms, Markets and charges

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**#137.** Norgaard, R. B. (1987). 'Economics as mechanics and the demise of biological diversity', *Ecological Modelling* 38:107-121

Macro explanations of the loss of biological diversity have emphasised how higher population levels have forced the transformation of relatively undisturbed areas and how industrial pollutants and energy-intensive agriculture have put new, and relatively uniform, selective pressure on species. This paper explores how a third macro phenomenon, social organisation based on specialisation and exchange, has contributed to the demise of biological diversity. It argues that knowledge, technologies and supporting structures evolved relatively independently up until a century ago, like patches on a patchwork quilt, with only regional exchange, including crops and agriculture. Hence people applied diverse selective pressure to a portion of each patch, meaning that people had little detrimental impact on biological diversity overall and in some cases even enhanced it. During the past century this patchwork quilt has transformed into a global exchange economy supporting a fourfold increase in population. The global order is organised around a monolithic vision based on comparative advantage, specialisation and exchange. This had resulted in a reduction of the number of crops grown over broad regions. Yet there is more variation within a given region with respect to crops grown in a given year, because each region responds to market signals generated by changes in all of the regions. Specialisation has reduced the diversity of selective pressure of agricultural



practices on species, while increased annual variation within each region has selected against species with narrow niches. The dominant vision of social organisation stems from the Newtonian model of systems consisting of mechanically related atomistic parts. This article presents a contrasting model of ecological systems consisting of tightly coevolved parts and relations. The maintenance of biodiversity will require moderation of the dominant vision and social organisation more often designed around a coevolutionary view.

**Coverage:** Global

**Ecosystem or sector focus:** Agriculture

**Topics:** Causes of biodiversity loss, Economic instruments

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**#138.** Norton-Griffiths, M., & Southey, C. (1995). 'The opportunity costs of biodiversity conservation in Kenya', *Ecological Economics* 12:125-139

This paper estimates the opportunity costs of biodiversity conservation in Kenya from the potential net returns of agricultural and livestock production, and compares them with the net returns from tourism, forestry and other conservation activities. At the national level, agricultural and livestock production in the parks, reserves and forests of Kenya could support 4.2 million Kenyans and generate gross annual revenues of \$565 million and net returns of \$203 million. These forgone net returns of \$203 million, some 2.8% of GDP, represent the opportunity cost to Kenya of biodiversity conservation. The current combined net venues of \$42 million from wildlife tourism and forestry are thus inadequate to cover these opportunity costs to land. The government of Kenya is clearly subsidising conservation activities whose chief values are all indirect and external to Kenya, and their ability to continue doing so will be a function of growth and modernisation in the Kenyan economy. Dependency on land will increase if the economy stagnates and rural populations continue to grow, and while the government of today may not consider disbanding the parks and reserves, the situation could be different in 25 years when rural populations have doubled again. In contrast, dependency on land will fall only once the economy grows and modernises and rural populations are drawn off the land and into industrial and service sectors. It is argued that

given the global nature of the benefits from Kenya's conservation efforts, it is inappropriate that so much of the cost is born by Kenya. The present scale of subsidies should instead form the basis for international negotiations to transfer funds to meet all or part of them. At present the global environment facility (GEF) is the only operational programme through which such contributions can be channelled to meet the incremental costs of biodiversity conservation, but situations such as the one described for Kenya were never envisaged when the GEF was designed. If the developed world expects a country like Kenya to maintain conservation estate on its behalf, then it must be prepared to contribute substantially towards these costs until such time as Kenya can afford to carry the burden itself.

**Coverage:** Africa

**Contains examples or case studies from:** Kenya

**Ecosystem or sector focus:** Wildlife, Protected Areas, Agriculture, Forests

**Topics:** Valuation, Economic policies, Subsidies, Incentive measures, Financial mechanisms

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**#139.** OECD, (1994), *Economic Incentive Measures for the Conservation and Sustainable Use of Biological Diversity: Conceptual Framework and Guidelines for Case Studies*. Organisation for Economic Co-operation and Development: Paris. 29 pp.

In 1993 the OECD Group on Economic and Environmental Policy Integration formed an Expert Group on Economic Aspects of Biodiversity to undertake a two year project on the use of economic incentive measures for the conservation and sustainable use of biological diversity. At the first meeting of the expert group it was agreed that the development of country case studies would be an appropriate and practical approach to acquiring better understanding of the use of economic incentives in support of biodiversity. This conceptual framework places the use of economic incentives into a larger perspective, linking incentives with the main causes of biodiversity loss and the objectives of the CBD.

**Coverage:** Europe



**Topics:** Convention on Biological Diversity, Incentive measures, Economic instruments, Economic policies, Causes of biodiversity loss

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**#140.** OECD, (1999b), *Handbook of Incentive Measures for Biodiversity: Design and Implementation*. Organisation for Economic Co-operation and Development: Paris. 171 pp. ISBN 92-64-17059-6

This is a practical handbook to assist policy makers in the design and implementation of appropriate incentive measures for the effective management of biodiversity. It synthesises the lessons learned from the experiences of OECD Member countries in the use of a variety of incentive measures, and combines this with a conceptual framework to develop comprehensive guidance on the policies available for preventing biodiversity loss. It uses case studies to illustrate the practical application of incentive measures for biodiversity in European countries and elsewhere.

**Coverage:** Global, Europe, Australia and New Zealand, Asia, Latin America

**Contains examples or case studies**

**from:** Australia, Austria, Canada, Denmark, Finland, France, Germany, Greece, Japan, Korea, Mexico, Netherlands, New Zealand, Poland, Turkey, UK, USA

**Ecosystem or sector focus:** Protected Areas, Agriculture, Forests, Marine and coastal, Wildlife, Water, Wetlands

**Topics:** Incentive measures, Economic instruments, Economic policies, Trade, Disincentives, Causes of biodiversity loss, Taxes, Subsidies, Financial mechanisms

**Other:** Also published in French.

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**#141.** OECD, (1999a), *Economic Instruments for Pollution Control and Natural Resources Management in OECD Countries: A Survey*. Organisation for Economic Co-operation and Development: Paris. 115 pp. The OECD Working Party on Economic and Environmental Policy Integration (WPEEPI) decided at its 12th Session on 6-7 November 1997, to launch a survey on the use of economic instruments for pollution control and natural resource management in OECD countries. The objectives of the survey were to update the OECD database on the use of economic

instruments for pollution control in OECD countries (last updated in 1992-1993); survey the use of economic instruments in OECD countries for natural resource management; and survey the use of financial assistance schemes in OECD countries for both pollution control and natural resource management. The ongoing OECD work programme on statistics on environmental taxes provided information on the use of environmentally related taxes for pollution control. Accordingly, a comprehensive questionnaire on the use of environmentally related economic instruments was sent to OECD countries in 1998, and responses were received from 24 of the 29 Member countries. This document presents the information contained in those submissions.

**Coverage:** Europe

**Topics:** Economic instruments, Incentive measures, Financial mechanisms, Economic policies

**Other:** Also published in French

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**#142.** O'Neill, J. (1997). 'Managing without prices: the monetary valuation of biodiversity', *Ambio* 26 (8):546-550

Environmental managers manage without prices - their day to day decisions are normally made without any appeal to monetary values or any other single common measure. But neo-classical economic theory suggests that monetary valuation is necessary in decision-making. This paper examines three arguments for monetary valuation of biodiversity and shows that none are satisfactory. While there may be problems in existing procedures for environmental decision-making, these do not include the failure to use monetary values.

**Coverage:** Global

**Topics:** Valuation

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**#143.** Othman, M. S. H., & Abdullah, N. M. R., (1991), *Economic Valuation of Wetland Plant, Animal and Fish Species of Tasek Bera and Residents' Perceptions on Development and Conservation*. AWB Publication No 77, Asian Wetland Bureau: Kuala Lumpur. 46 pp.

This document reports on a survey carried out on the economic values of plant, animal and fish

species utilised by residents of the wetlands of Tasek Bera in Malaysia. Perceptions on conservation issues arising from agricultural developments and proposed power transmission lines are also evaluated. The study suggests that the average annual household value derived from wetlands is RM 2,504, to a total of RM 463,166 for the whole community. Younger generations are found to not support any development programmes, while those in the higher income bracket are ignorant of the environmental effects of developments. Although some kinds of passive development projects are welcomed by the community, most respondents preferred their area to be conserved for the benefit of future generations. The study concludes that there is a need to develop the Tasek Bera area, but care must be taken in carrying out such projects so that damage to forest and wetland areas is minimised.

**Coverage:** Asia

**Contains examples or case studies from:** Malaysia

**Ecosystem or sector focus:** Marine and coastal, Wetlands, Agriculture, Infrastructure, Fisheries, Forests

**Topics:** Valuation, Causes of biodiversity loss, Market valuation

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**#144.** Panayotou, T., (1994c), *Financing Mechanisms for Environmental Investments and Sustainable Development*. Environmental Economics Series Paper No 15, United Nations Environment Programme: Nairobi. 44 pp.

This document addresses the issues involved in finding funds to fill the financing gap of implementing sustainable development initiatives, and meeting the obligations attached to multilateral environmental agreements. It looks both at ways of reducing existing financing needs, of generating additional resources from existing mechanisms, and of deploying new and innovative financing mechanisms for environmental conservation. Examples of financing mechanisms are given from around the world.

**Coverage:** Global

**Topics:** Financial mechanisms, Economic instruments, Economic policies, Bioprospecting, Markets and charges, Taxes, Subsidies,

International Conventions, Trust Funds, Carbon offsets, Payments for environmental services

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**#145.** Panayotou, T., (1994b), *Economic Instruments for Environmental Management and Sustainable Development*. Environmental Economics Series Paper No 16, United Nations Environment Programme: Nairobi. 108 pp.

The importance of economic instruments for environmental policy is stressed in both the Rio Declaration and Agenda 21. Economic instruments provide a way of internalising the costs of environmental degradation and instituting the polluter-pays principle. They also provide a means for governments to deal with environmental issues in a cost effective manner. This report presents a comprehensive outline of economic instruments for environmental management, illustrated with case studies from around the world.

**Coverage:** Global, Europe, North America, Pacific, Latin America, Australia and New Zealand, Asia, Africa

**Contains examples or case studies from:** USA, Germany, Netherlands, Denmark, France, Italy, Norway, Sweden, New Zealand, Finland, Brazil, Cote d'Ivoire, Sri Lanka, Papua New Guinea, Congo, Ghana, Central African Republic, China, Pakistan, Chile, Malaysia, Poland

**Ecosystem or sector focus:** Marine and coastal, Fisheries, Forests, Water, Industry, Urban settlements

**Topics:** Incentive measures, Economic instruments, Financial mechanisms, Taxes, Subsidies, Markets and charges, Bonds and deposits, Property rights, Deforestation, Pollution, Economic policies

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**#146.** Panayotou, T. (1994a). 'Conservation of biodiversity and economic development: the concept of transferable development rights', *Environmental and Resource Economics* 4 (1):91-110

Coastal areas of the Akamas Peninsula in north-west Cyprus have a high level of biodiversity, as well as containing several rare and endemic plant species. Part of the Akamas Peninsula has been zoned by the Government of Cyprus as a non-development area. So as to save costs in its conservation, raise funds and avoid conflicts with

potential developers, a system of transferable development rights has been proposed. Under this scheme developers, rather than being compensated with cash for activities foregone, would retain their rights to development but not be able to exercise them on-site. Development rights could be traded for property in other areas, or sold to groups concerned with the conservation of the Akamas Peninsula.

**Coverage:** Europe

**Contains examples or case studies from:** Cyprus

**Ecosystem or sector focus:** Marine and coastal

**Topics:** Economic instruments, Markets and charges, Property rights

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**#147.** Pearce, D., (1991), *Afforestation and the Greenhouse Effect: The Economics of Fixing Carbon by Growing Trees*. Gatekeeper Series, GK 91-04, London Environmental Economics Centre: London. 5 pp.

Concern about global warming has focused attention on ways of reducing greenhouse gas emissions. This short paper looks at carbon fixing by trees, and suggests methods with which to calculate the economic value of this.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Climate change, Valuation, Carbon offsets

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**#148.** Pearce, D., (1991), *An Economic Approach to Saving the Tropical Forests*. London Environmental Economics Centre: London. 30 pp.

This paper examines economic aspects of forest conservation and degradation. It describes one approach to decision-making about tropical forest use - the cost-benefit approach. Describing the total economic value of tropical forests, the paper gives examples of how they can be calculated. It concludes that the concept of total economic value offers a comprehensive framework within which to value tropical forests.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Valuation, Economic policies

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**#149.** Pearce, D., (1992), *Economic Valuation and the Natural World*. Centre for Social and Economic Research on the Global Environment: London. 170 pp.

This document introduces the concepts and methodologies for environmental valuation. It argues that making choices in the context of environmental quality involves comparing private and public, priced and unpriced goods. In this context it is necessary to impute a value to environmental goods and services, and making sure that these values are reflected in economic policies and programmes and in market prices. The paper describes the importance of valuing environmental goods and services, and presents methods and examples of this for different countries and ecosystems.

**Coverage:** Global

**Ecosystem or sector focus:** Forests, Wetlands, Protected Areas, Water, Wildlife, Urban settlements, Industry

**Topics:** Valuation, Economic planning, Economic policies

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**#150.** Pearce, D., Barbier, E. B., & Markandya, A., (1988), *Environmental Economics and Decision-Making in Sub-Saharan Africa*. LEEC Paper DP 88-01, London Environmental Economics Centre: London. 23 pp.

Africa's economic crisis is largely an agricultural crisis, which means that it is also an environmental crisis. Analysing the interaction between economy and the environment is the subject matter of environmental economics. This paper applies environmental economics principles and tools to economic and environmental issues in Sub-Saharan Africa. It looks at assessing the state of the environment, at identifying economic factors that lead to natural resource changes, at shifts in economic behaviour and their motivations, at valuation of the costs of environmental degradation and at devising market and economic policy measures which aim to provide incentives for sustainable development and environmental management.

**Coverage:** Africa

**Ecosystem or sector focus:** Agriculture

**Topics:** Incentive measures, Valuation, Trade, Causes of biodiversity loss, Economic instruments, Economic policies

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**#151.** Pearce, D., & Moran, D., (1994), *The Economic Value of Biodiversity*. Earthscan Publications Ltd: London. 172 pp. ISBN 1 85383 195 6

Economics and conservation are at loggerheads. In particular, economic forces drive biodiversity loss. This book argues that this conflict doesn't have to be the case. It is the result of market failures, producing skewed decisions and destructive policies. Yet the values of biodiversity can be captured, and used to change economic decisions. This book looks at the economic causes of biodiversity loss, and describes methodologies for economic valuation. Case studies from different countries and sectors are also presented to illustrate the economic valuation of biodiversity. The book also looks at ways of capturing biodiversity values through markets and other means. It concludes by looking at the ways in which economic development can be reconciled with biodiversity conservation goals.

**Coverage:** Global, Europe

**Contains examples or case studies from:** Botswana, Peru

**Ecosystem or sector focus:** Drylands, Wetlands, Marine and coastal, Agriculture, Forests

**Topics:** Valuation, Causes of biodiversity loss, Economic instruments, Economic policies, Incentive measures, Financial mechanisms

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**#152.** Pearce, D., & Warford, J., (1993), *World Without End: Economics, Environment and Sustainable Development*. Oxford University for the World Bank: New York. 440 pp. ISBN 0-19-520881-1

This book explores how economic growth can become environmentally sustainable. It provides a background and overview to the concept of sustainable development, and to the links between economic theory and the environment. The book addresses the causes of and policy responses to resource degradation as well as analysing

international environmental issues from an economic standpoint.

**Coverage:** Global

**Ecosystem or sector focus:** Forests, Agriculture, Water, Industry, Infrastructure

**Topics:** Trade, Valuation, Economic instruments, Financial mechanisms, Taxes, Subsidies, Disincentives, Causes of biodiversity loss, Economic policies, Incentive measures, Climate change, Pollution

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**#153.** Perrings, C., (1995), *Economic Values of Biodiversity*. Reprint Series, Beijer International Institute of Ecological Economics, The Royal Swedish Academy of Sciences: Stockholm. 87 pp.

The important gap between the market price of environmental resources and their value to individuals and society is only gradually coming to be understood. Together market and policy failures are the main underlying causes of biodiversity loss. To resolve these we need first to evaluate their consequences. Valuation can be seen as a method of determining the relative importance of the environmental consequences of economic activities. This paper describes in detail, with examples, the theory and methodology of biodiversity valuation. It then goes on to explain and illustrate how valuation can be applied and used as a tool for biodiversity conservation, such as through the use of incentive measures.

**Coverage:** Global

**Ecosystem or sector focus:** Forests, Tourism

**Topics:** Deforestation, Valuation, Economic instruments, Economic policies, Contingent valuation, Travel cost, Effect on production, Market valuation, Incentive measures, Markets and charges, Taxes, Subsidies

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**#154.** Perrings, C., Folke, C., & Maler, K.-G., (1992), *The Ecology and Economics of Biological Diversity: Elements of a Research Agenda*. Beijer Discussion Paper No 1, Beijer International Institute of Ecological Economics, The Royal Swedish Academy of Sciences: Stockholm. 48 pp. ISBN 1102-4941

This paper lists the issues that are thought to be important elements of a research agenda on the



ecology and economics of biodiversity loss, but with emphasis on the economics of the problem. It also provides some motivation for the priorities suggested. The first cluster of priorities relates to ecological questions concerning the nature and measurement of change in biodiversity, both globally and at the level of particular ecosystems. The second concerns economic valuation. The third concerns the driving forces behind biodiversity loss, and the fourth concerns the question of what is to be done.

**Coverage:** Global

**Topics:** Valuation, Incentive measures, Carbon offsets, Economic instruments, Economic policies, Causes of biodiversity loss

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**#155.** Perrings, C., Gilbert, A., Pearce, D., & Harrison, A., (1989), *Natural Resource Accounts for Botswana: Environmental Accounting for a Natural Resource-Based Economy*. LEEC Paper DP 89-11, London Environmental Economics Centre: London. 66 pp.

For various reasons the existing national accounts do not contain adequate measures of the natural resources used in Botswana. The main reason for this is that many resources are under communal or common ownership, and are not traded. This means that there are no market prices by which to measure their relative value. This report considers the advantages of creating a set of accounts to include measures of the value of environmental goods and services, and suggests methods for proceeding with the construction of such accounts.

**Coverage:** Africa

**Contains examples or case studies from:** Botswana

**Topics:** Environmental accounting, Incentive measures, Causes of biodiversity loss, Economic policies, Disincentives, Valuation

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**#156.** Perrings, C., & Pearce, D. (1994). 'Threshold effects and incentives for the conservation of biodiversity', *Environmental and Resource Economics* 4:13-28

Biological diversity is a central component of the stock of natural capital on which all economic development is based. Other things being equal,

loss of biological diversity implies loss of development potential, and its conservation through sustainable use or outright protection implies the protection of that potential. One characteristic of biodiversity loss of especial importance is that it is associated with ecological threshold effects. This paper explores the implication of this characteristic for the properties of a biodiversity conservation strategy.

**Coverage:** Global

**Topics:** Incentive measures, Causes of biodiversity loss, Economic instruments, Economic policies

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**#157.** Peters, C., Gentry, A., & Mendelsohn, R. (1989). 'Valuation of an Amazonian rainforest', *Nature* (339):655-656

In an exercise to estimate the conservation value of an area of Amazonian rain forest in terms of its value for sustainable non-timber and timber product extraction, local market prices (less collection and transport costs) were used. This was based on data collected on market prices, and analysis of quantities of products harvested and sold. Using a 5% discount rate, a "net present conservation value" of US\$ 6,800 per hectare of forest was calculated. This figure was far higher than the returns from clear-cut timber harvesting, or from subsequent plantations or cattle ranching.

**Coverage:** Latin America

**Contains examples or case studies from:** Peru

**Ecosystem or sector focus:** Forests

**Topics:** Market valuation, Valuation

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**#158.** Phillips, A., (1998), *Economic Values of Protected Areas: Guidelines for Protected Area Managers*. IUCN - The World Conservation Union: Gland and Cambridge. 52 pp. ISBN 2-8317-0461-8

These guidelines look at how economic values can be assessed for protected areas, and identify cases where protecting the environment has made a significant contribution to the economy. They use a number of case studies to illustrate these methods, and to reveal that protected areas are often significant revenue earning entities and can provide great benefits to national and local economies. This, in turn, provides an opportunity



for sustainable industries and for the generation of financial returns. With proper management, these economic values can be identified and captured for the benefit of both conservation and economic development.

**Coverage:** Global, Caribbean, Pacific, Australia and New Zealand, Africa, Asia, Europe

**Contains examples or case studies**

**from:** Kenya, Uganda, Madagascar, Croatia, India, Nepal, South Africa, Australia, Honduras, Belize, Fiji

**Ecosystem or sector focus:** Protected Areas

**Topics:** Valuation

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**#159.** Phillips, A., (2000), *Financing Protected Areas: Guidelines for Protected Area Managers*. IUCN - The World Conservation Union: Gland. 58 pp. ISBN 2-8317-0544-4

These guidelines aim to provide protected area managers with information about financing their protected areas and where to look for finance beyond existing sources. Access to funds is becoming increasingly important for effective management. The guidelines cover the development of a financial strategy, provide information on financing sources, and illustrate this with a number of national case studies.

**Coverage:** Global, Africa, Latin America

**Contains examples or case studies**

**from:** New Zealand, South Africa, Costa Rica

**Ecosystem or sector focus:** Protected Areas

**Topics:** Financial mechanisms

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**#160.** Repetto, R., (1996), *Macroeconomic Policies and Biodiversity Loss*. Paper presented at IUCN Workshop on Economics of Biodiversity Loss, April 1996, Gland, Switzerland. 8 pp.

<http://www.biodiversityeconomics.org>

This paper focuses on macroeconomic policy and its relationship to the destruction of tropical forests. Forests and woodlands are threatened by demand for agricultural land, which depends on domestic demand for agricultural products, which responds to growth in population, per capita

income and income distribution, which, in turn, depend on macroeconomic policies. Several macroeconomic policies are identified as having pervasive influences on the use and conservation of forest resources. These include forest revenue structures, trade and investment incentives to promote wood-using industries, and credit, tax and pricing incentives for land-intensive plantations and ranches. For instance, a policy of openness to international trade can aggravate the problem of biodiversity loss because it will increase the demand for forest products and because countries at early stages of development that export mostly primary commodities will not resist the pressure to cut down their forests.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Economic instruments, Economic policies, Causes of biodiversity loss

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**#161.** Richards, M. (1994). 'Towards valuation of forest conservation benefits in developing countries', *Environmental Conservation* 21 (4):308-319

This article argues that the valuation of both marketed and non-marketed forest benefits forms a vital tool for policymaking and decision making. It presents basic concepts in the economic analysis of forest conservation, describes different valuation methods, and provides case studies of the valuation of forest conservation benefits from various developing countries.

**Coverage:** Global, Africa, Asia, Latin America, Middle East and North Africa

**Contains examples or case studies**

**from:** Nigeria, Ethiopia, Nepal, Cameroon, Djibouti, Uganda, Peru, Costa Rica, Zimbabwe, Morocco

**Ecosystem or sector focus:** Forests, Watersheds

**Topics:** Valuation

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**#162.** Richards, M., (1999), *'Internalising the Externalities' of Tropical Forestry: A Review of Innovative Financing and Incentive Mechanisms*. Overseas Development Institute: London. 38 pp. ISBN 0 85003 402 7

This paper, commissioned by the European Commission, reviews the potential of innovative

financing mechanisms and financial incentives for sustainable forestry in the tropics. It attempts to provide guidance for donors and other decision makers. It is argued that the main problem is not a lack of finance per se, but that forestry is unattractive compared to other land uses, primarily due to market and policy failures which either depress the value of forest products or make other land uses more profitable. Thus a key challenge is to find ways of modifying market incentives so that sustainable forestry becomes more attractive than other land uses. A range of financial mechanisms and incentives are described and reviewed, with case studies given from around the world.

**Coverage:** Global, Africa, Asia, Latin America

**Contains examples or case studies from:** Nigeria, Costa Rica, Nepal

**Ecosystem or sector focus:** Forests

**Topics:** Financial mechanisms, Incentive measures, Economic instruments, Causes of biodiversity loss, Economic policies, Private sector, Taxes, Subsidies, Debt conversion, Carbon offsets, Payments for environmental services

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**#163.** Rubec, C., (1996), *Canadian Case Study on a National Tax Incentive Measure for Biodiversity*. Paper presented at workshop on Incentives for Biodiversity: Sharing Experiences, 4th Global Biodiversity Forum, Montreal, Canada 30 August - 1 September 1996. 3 pp.

<http://www.biodiversityeconomics.org>

This paper summarises amendments to Canadian tax law which enable people to donate ecologically sensitive lands to conservation interests. Seen as a complement to traditional conservation efforts such as establishing parks, this new law uses economic incentives to further biodiversity conservation.

**Coverage:** North America

**Contains examples or case studies from:** Canada

**Ecosystem or sector focus:** Forests, Protected Areas, Wildlife

**Topics:** Private sector, Incentive measures, Taxes

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**#164.** Rubino, M. C., de Callejon, D. P., & Lent, T., (2000), *Business and Biodiversity in Latin America*. Discussion Paper, Environmental Projects Unit, International Finance Corporation: Washington DC. 53 pp.

This document looks at the emerging sector of biodiversity business. It argues that the alliance between businesses and conservation interests offers enormous potential benefits. The report outlines the business and conservation rationale for such investments, and some of the investment opportunities in biodiversity-linked businesses. It also analyses financing needs for such initiatives. Illustrative case studies are provided from different countries in Latin America.

**Coverage:** Latin America

**Contains examples or case studies from:** Brazil, Argentina, Paraguay, Bolivia, Peru, Ecuador, Chile, Venezuela, Mexico, Honduras, Costa Rica

**Ecosystem or sector focus:** Agriculture, Forests, Tourism

**Topics:** Trade, Private sector, Economic instruments, Financial mechanisms

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**#165.** Ruitenbeek, J. (1992). 'The rainforest supply price: a tool for evaluating rainforest conservation expenditures', *Ecological Economics* 6:52-78

Economic policies are often suggested as mechanisms for promoting rainforest conservation in developing countries. To help decide whether international resources should be used to protect specific rainforests, the calculation of a 'rainforest supply price' (RSP) is proposed. Korup National Park in Cameroon contains the oldest rainforest in Africa and as a haven for important endangered species - it is the subject of active international conservation efforts. A cost-benefit analysis of a conservation project to protect Korup from increased land-use pressures suggests that it is not in Cameroon's interest unless a 5.4 million ECU inducement is transferred to Cameroon. Given the protection afforded, the transfer is equivalent to a RSP of 1060 ECU per km "SUP 2" per year. Evaluation of six other tropical rainforest projects suggest that international donors made transfers having values ranging from 15 to 1575 ECU per km "SUP 2" per year. It is thus concluded that the

inducements required are within a range that conservation interests are apparently willing to mobilise.

**Coverage:** Global, Asia, Africa, Latin America

**Contains examples or case studies**

**from:** Cameroon, Bolivia, Ecuador, Philippines, Costa Rica, Nigeria

**Ecosystem or sector focus:** Forests

**Topics:** Valuation, Economic instruments, Economic policies, Financial mechanisms

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**#166.** Saichoon, S. M. (1995). 'Contingent valuation as an additional tool for evaluating wildlife utilisation management in Zambia: Mumbwa Game Management Area', *Ambio* 24 (4):246-249

This case study evaluates self interest in wildlife management by the local community of the Mumbwa Game Management Area in Zambia. The discussion centres on the methods employed - contingent valuation. The results show a positive reception to new approaches by the park managing authority. The contingent valuation approach is used to determine the willingness to pay and willingness to accept compensation by community members based on their consumption of wildlife. The study however also demonstrates a land use conflict with negative responses to wildlife.

**Coverage:** Africa

**Contains examples or case studies**

**from:** Zambia

**Ecosystem or sector focus:** Wildlife, Protected Areas, Drylands

**Topics:** Valuation, Contingent valuation, Causes of biodiversity loss, Financial mechanisms

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**#167.** Salazar, J. E., (1998), *Environmental Finance: Linking Two Worlds*. Paper presented at a workshop on Financial Innovations for Biodiversity, 10th Global Biodiversity Forum, Bratislava, Slovakia, 1-3 May 1998. 15 pp.

<http://www.biodiversityeconomics.org>

Why financiers can not digest and incorporate - easily - environmental issues into its core business? In building a bridge between the financial and the environmental world there are many issues to be

addressed to. Financiers and environmentalists are people with its own approach, philosophy, language, definition on success and failure, accounting, among other. Then in promoting financial innovations for biodiversity, discrepancies and coincidences should be analysed. In Peru, from 1996 several workshops, interviews and a survey at the financial community were carried out (sponsored by the University of Kent, the Ebert Foundation, GTZ, British Council and PROFONANPE) to learn about local financier's use of eco-criteria into its decision making process. Here the driving idea was that by changing financier's criteria, business practices could change. In Peru, financiers have a strong influence on their clients' practices (because of their small capitalisation level and dependence on debt) and are a reduced number while the business community is enormous. As at July 1998, in Peru there is no private environmental funds (venture or development capital), so for developing the first one it was critical to identify a project pipeline (e.g., to offer to potential investors) to market this initiative. In doing so, financiers found difficult to understand bio-conservation rationale but it was easy (for financiers) to digest clean technology issues (driven by eco-efficiency). So financier's preferences for brown (to green) projects are highlighting critical issues, which must be analysed in detail.

**Coverage:** Latin America

**Contains examples or case studies**

**from:** Peru

**Topics:** Private sector, Financial mechanisms, Trust Funds, Taxes

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**#168.** Salazar, J. E., (2000), *El Banquero Exitoso del Tercer Milenio*. Friedrich Ebert Stiftung: Lima. 146 pp. ISBN 9972-43-024-3

This book looks at needs and opportunities for the financial sector in Peru to take account of environment and biodiversity concerns. It aims to influence decision-makers and policy makers from banks and other financial institutions to look at the sustainability of their business operations. It makes a number of proposals and recommendations for the opportunities for bio-financing, and outlines some of the tools and methods available for achieving this.

**Coverage:** Latin America

**Contains examples or case studies from:** Peru

**Topics:** Financial mechanisms, Economic instruments, Economic policies, Incentive measures

**Other:** Spanish language publication.

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**#169.** Sanchirico, J. N., & Willen, J. E., (1998), *Marine Reserves: Is There a Free Lunch?* Discussion Paper 99-09, Resources for the Future: Washington DC. 27 pp.

This paper employs a spatial and intertemporal model of renewable resource exploitation to investigate the effects of marine reserve creation. The model combines the H. S. Gordon/Vernon Smith hypothesis of a rent dissipation process with Ricardian notions that resources are exploited across space in a pattern dependent upon relative profitabilities. The metapopulation model employed here incorporates modern biological ideas that stress patch heterogeneity, linkages, and dispersal processes between patches. The spatial bioeconomic model is then used to simulate the effects of reserve creation under various ecological structures. It finds, under certain parameter configurations and ecological linkages, that there is potential for a "double-dividend" where both aggregate biomass and harvest increase after an area of the fishery is set aside and protected from exploitation.

**Coverage:** Global

**Ecosystem or sector focus:** Marine and coastal, Protected Areas, Fisheries

**Topics:** Incentive measures, Causes of biodiversity loss, Valuation

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**#170.** Schelske, O., (1998), *Financial Innovations for Biodiversity: the Swiss Experience*. Paper presented at a workshop on Financial Innovations for Biodiversity, 10th Global Biodiversity Forum, Bratislava, Slovakia, 1-3 May 1998. 27 pp.

<http://www.biodiversityeconomics.org>

In Switzerland, the issue of biodiversity protection is addressed through several sectoral policies. This paper analyses two cases of sectoral policies: ecological direct payments, which are within the realm of Swiss agricultural policy; and the activities of the Swiss Foundation for the Conservation of Cultural Landscapes (Fonds

Landschaft Schweiz, FLS) which is within the realm of Swiss conservation policy. Both cases represent examples of the use of financial instruments for the protection of biodiversity. One of the most highly regulated and controlled sectors in Swiss economy, Swiss agriculture was reformed in 1992 due to the GATT Uruguay Round. Agricultural price and income policies were separated and domestic support prices were decreased. Swiss agriculture became multi-functional. Its objectives are now to ensure food supply for the national population, to protect natural resources (especially biodiversity), to protect traditional landscapes and to contribute to the economic, social and cultural life in rural areas. On one hand, direct payments are used to ease the transition of Swiss agriculture toward global and free market conditions. On the other hand, direct payments are offered to those farmers who are willing to use more ecological and biodiversity-sound management practices. This paper shows the design and success of these direct payments. Another instrument for biodiversity protection is the Swiss Foundation for the Conservation of Cultural Landscapes (Fonds Landschaft Schweiz). It was set up by the Swiss Parliament during Switzerland's 700-year celebration in 1991. The Foundation supports specific projects for nature and landscape conservation, for example the conservation and sustainable use of old orchards, corridors of regional ecosystems, or old chestnut plantations in southern Switzerland. The Foundation is financed by federal, cantonal and communal authorities and by private donations. Biodiversity protection policies are beginning to be implemented into agricultural and landscape policies. Because biodiversity protection is a broad concept, a concentration on funds from agricultural and landscape policies will not be sufficient. Therefore, instruments focusing on other sectors should be suggested.

**Coverage:** Europe

**Contains examples or case studies from:** Sweden

**Ecosystem or sector focus:** Agriculture

**Topics:** Causes of biodiversity loss, Economic instruments, Financial mechanisms, Taxes, Subsidies, Private sector

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**#171.** Seidl, A., (1998), *Financing Open Space in Colorado, USA*. Paper presented at a workshop on Financial Innovations for



Biodiversity, 10th Global Biodiversity Forum, Bratislava, Slovakia, 1-3 May 1998. 12 pp.  
<http://www.biodiversityeconomics.org>

The Colorado State Land Board's Stewardship Trust was established through a constitutional amendment in November of 1996. The Board is required to designate 295,000 to 300,000 acres of trust lands into a special trust--the Stewardship Trust by January 1, 2001. This land will be preserved and managed as to preserve its natural values. The Board can use a number of land management tools in order to accomplish its goals including: conservation easements, the purchase of development rights, sales, leases, exchanges for conservation purposes etc. Lands must be nominated for the Trust and evaluated based upon their potential value to the common good in preserving representative ecosystems and critical habitats in the state of Colorado. The Great Outdoors Colorado (GOCO) program was established in 1992 and charged with making matching fund grants to local governments, park and recreation districts and non-profit land protection organisations to facilitate the purchase and protection of land. Programs include trail construction, open space, wildlife and river preservation, environmental education, park promotion, wildlife and outdoor recreation. GOCO is financed through earmarked state lottery funds and has provided more than \$100 million for 808 projects to date. Several other states including Utah, Montana, and Wisconsin are considering creating similar quasi-governmental programs for decentralised land use planning. The proposed Colorado Wilderness Tax would be the first state sales tax to target non-consumptive users of natural resources. The Wilderness Tax would be imposed on items commonly purchased by non-consumptive users of the state's natural resources including: cameras and film, binoculars, camping equipment, backpacks and hiking boots. Tax revenues are to be earmarked for the management and protection of Colorado's wilderness areas. Voters are conflicted over the equity and efficiency of the proposed legislation.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Protected Areas, Tourism

**Topics:** Private sector, Financial mechanisms, Taxes

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**#172.** Shogren, J. F., Tschirhart, J., Anderson, T., Whritenour Ando, A., Bessinger, S. R., Brookshire, D., Brown, G., Coursey, D., Innes, R., Meyer, S. M., & Polasky, S. (1999). 'Why economics matters for endangered species protection', *Conservation Biology* 13 (6):1257-1261

This article offers three reasons why economics matters more to species protection than many people think and what this implies for the ongoing debate over the reauthorisation of the US Endangered Species Act of 1973. Economics matters because human behaviour generally, and economic parameters in particular, help determine the degree of risk to a species. In a world of scarce resources, the opportunity cost of species preservation must be taken into account in decision making. Economic incentives are critical in shaping human behaviour, and consequently the recovery of species. Endangered species protection that explicitly addresses these basic principles can avoid wasting valuable resources that yield no gain in species protection.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Wildlife, Protected Areas

**Topics:** Incentive measures, Causes of biodiversity loss

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**#173.** Simpson, D. R., & Sedjo, R. A., (1996), *Valuation of Biodiversity for Use in New Product Research in a Model of Sequential Search*. Discussion Paper 96-27, Resources for the Future: Washington DC. 1996 pp.

We develop a model of search in which a researcher chooses the size of sequential batches of samples to test. While earlier work has considered similar questions, the contribution of this paper is to use the search model to place a value on the marginal research opportunity. The valuation of such opportunities may be of little interest or relevance in many of the contexts in which search models are employed, but we apply our analysis to an area of considerable societal interest: the valuation of biological diversity for use in new product research. While data from which to make inferences are limited, we find that, using plausible estimates of relevant



parameters, the value of biodiversity in these applications is negligible.

**Coverage:** Global

**Topics:** Bioprospecting, Incentive measures, Markets and charges, Valuation

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**#174.** Simpson, R. D., (1995), *Biodiversity prospecting and biodiversity conservation*.

Paper presented at IUCN Workshop on Financing Biodiversity Conservation Harare, Zimbabwe 13-15 September 1995. 12 pp.

<http://www.biodiversityeconomics.org>

Biodiversity prospecting is the search for chemicals produced by wild organisms. The author of this paper argues that the economic values generated by biodiversity prospecting are negligible, that investments made in strengthening biodiversity prospecting capacity are likely to have little effect on economic incentives for the conservation of endangered habitats, and that in addition to their shortcomings as conservation strategies, biodiversity prospecting may also have severe drawbacks as development strategies.

**Coverage:** Global

**Topics:** Bioprospecting, Valuation

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**#175.** Simpson, R. D., (1999), *The price of biodiversity*.

<http://www.nap.edu/issues/15.3/simpson.htm>

This paper looks at the ways in which conservation agencies use economic arguments to convince people in developing countries to conserve biodiversity. It argues that all too often such attempts are misguided, and can lead to serious inequities. These failures also damage the credibility of conservationists, who would do better to take a different approach to promoting biodiversity.

**Coverage:** Global

**Ecosystem or sector focus:** Tourism

**Topics:** Financial mechanisms, Private sector, Bioprospecting, Markets and charges, Incentive measures

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**#176.** Simpson, R. D., & Craft, A. B., (1996), *The Social Value of Using Biodiversity in New Pharmaceutical Product Research*.

Discussion Paper 96-33, Resources for the Future: Washington DC. 46 pp.

Biologists and conservation advocates have expressed grave concern over perceived threats to biological diversity. "Biodiversity prospecting" -- the search among naturally occurring organisms for new products of agricultural, industrial, and, particularly, pharmaceutical value -- has been advanced as both a mechanism and a motive for conserving biological diversity. Economists and others have attempted to estimate the value of biodiversity for use in new pharmaceutical project research. Most of these existing approaches are incomplete, however, as they have not considered full social welfare, i.e., both consumer surplus and profit. This paper addresses social welfare by calibrating a model of competition between differentiated products with data from the pharmaceutical industry. We find that the magnitude of losses from even catastrophic declines in biodiversity are negligible in comparison to the value of world production. While social values of biodiversity prospecting might motivate habitat conservation in some areas, these values are likely to be small relative to land value in other uses in even some of the more biologically rich regions of the world.

**Coverage:** Global

**Topics:** Bioprospecting, Causes of biodiversity loss, Incentive measures, Financial mechanisms, Markets and charges

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**#177.** Simpson, R. D., & Sedjo, R. A., (1996), *Investments in Biodiversity Prospecting and Incentives for Conservation*. Discussion Paper 96-14, Resources for the Future: Washington DC. 17 pp.

There is considerable interest in biodiversity prospecting (the search for valuable new products from natural sources) as a conservation strategy. In an earlier paper, we have argued that the value of the marginal species (and, by extension, the incentives for the conservation of the habitat on which it is found) is small. In this paper, we show that investments in biodiversity prospecting are unlikely to increase incentives for conservation by much. If the value of the marginal species were appreciable, researchers ought already to have made investments to exploit it. If it is not, it is doubtful that additional investments will generate any substantial increase. It is important to be clear about our findings: we are not saying that none of

the myriad uses of biodiversity is important. Quite to the contrary, we are saying that if biodiversity is important, more effective strategies for its conservation must be found.

**Coverage:** Global

**Topics:** Financial mechanisms, Bioprospecting, Incentive measures, Markets and charges

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**#178.** Spanninks, F., & van Beukering, P., (1997), *Economic Valuation of Mangrove Ecosystems: Potential and Limitations*. CREED Working Paper No 14, International Institute for Environment and Development: London. 53 pp.

Mangrove ecosystems provide a range of both marketed and non-marketed goods and services, on and off-site. Yet the full value of these goods and services is not easily recognised, and is therefore often neglected in development planning. Economic valuation methods can balance this omission and can contribute to more informed decision making. This paper reviews the scope and limitations of different valuation methods for mangrove ecosystems. It makes particular reference to the goods and services of Pagbilao Bay in the Philippines.

**Coverage:** Asia

**Contains examples or case studies from:** Philippines

**Ecosystem or sector focus:** Wetlands, Marine and coastal

**Topics:** Valuation

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**#179.** Spurgeon, J. P. G. (1998). 'The socio-economic costs and benefits of coastal habitat rehabilitation and creation', *Marine Pollution Bulletin* 37 (8-12):373-382

This paper provides an overview of the merits and limitations of using an economics-based approach to assess and implement initiatives for coastal habitat rehabilitation and creation. A review of the literature indicates that habitat rehabilitation/creation vary widely between and within ecosystems. For coral reefs, costs range from US\$10,000 to 6.5 million per hectare; for mangroves US\$3,000-510,000/ha; for seagrasses US\$9,000-680,000/ha; and for saltmarshes US\$2,000-160,000/ha. A review of the economic

benefits derived from various coastal habitats using a Total Economic Value approach reveals that many thousands of dollars per hectare could ultimately accrue from their rehabilitation/creation. The paper concludes that despite its limitations, a benefit-cost analysis framework can play an important role both in assessing the justification of coastal habitat rehabilitation/creation initiatives, and by helping to improve the overall effectiveness of such initiatives.

**Coverage:** Global

**Ecosystem or sector focus:** Marine and coastal

**Topics:** Valuation, Replacement costs, Effect on production, Mitigative and averted expenditures

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**#180.** Spurgeon, J. P. G., & Aylward, B., (1992), *The Economic Value of Ecosystems: 4 - Coral Reefs*. Gatekeeper Series No GK 92-03, London Environmental Economics Centre: London. 15 pp.

Coral reef ecosystems provide a variety of valuable economic benefits to individuals and society. Yet, despite this high economic value they are threatened by human activities. This paper outlines methods and examples for the economic valuation of coral reefs. It suggests that a proper understanding and accounting of these economic benefits will lead to improved management of reef ecosystems.

**Coverage:** Global

**Ecosystem or sector focus:** Marine and coastal

**Topics:** Valuation, Bioprospecting

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**#181.** Stedman-Edwards, P., (1998), *Root Causes of Biodiversity Loss: An Analytical Approach*. Macroeconomics Program, WWF - World Wide Fund for Nature: Washington DC. 86 pp.

This document presents an in-depth analysis of the economic and non-economic root causes of biodiversity loss. It presents a framework for identifying and analysing root causes of biodiversity loss, collecting data and applying conceptual models. These are illustrated with examples from around the world.

**Coverage:** Global, Asia, Africa, Latin America

**Contains examples or case studies**

**from:** Mexico, Guatemala, Bolivia, Indonesia, Thailand, Cameroon, Honduras, Ecuador, India

**Ecosystem or sector focus:** Agriculture, Forests, Marine and coastal

**Topics:** Trade, Economic instruments, Incentive measures, Disincentives, Deforestation, Land degradation, Soil erosion, Private sector, Population growth, Taxes, Subsidies

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**#182.** Steenblik, R., (1998), *Subsidy Reform: Doing More to Help the Environment by Spending Less on Activities that Harm It*. Paper presented at a workshop on Doing More With Less, IUCN's 50th Anniversary, Fontainebleau, France, November 1998. 23 pp. <http://www.biodiversityeconomics.org>

This paper has one overarching objective: to underline the importance of continuing the reform of government policies and programmes that generate “biodiversity-perverse” subsidies, and to encourage the conservation community to further develop their capacity to speak authoritatively on the issue. As a prelude, the paper reviews the inefficiencies created by subsidies, and the effects they have on the environment in general and biodiversity in particular. It then turns to the current multilateral mechanisms being applied to discipline subsidies to resource-based sectors, with a view to identifying areas in need of further strengthening. Most of the mechanisms used to date reflect attempts to deal with the trade and budgetary effects of subsidies. The application of these disciplines can be expected, in general, to reduce or even eliminate many of the policy-driven incentives to farm intensively, overfish and burn dirty fuels. But governments usually have considerable discretion in how they interpret such disciplines; large variations in the incidence of subsidies within nations can have important implications for their effects on particular ecosystems. It is in identifying such links, this paper suggests, that civil society, particularly environmental NGOs, can make the greatest contribution to the process of subsidy reform.

**Coverage:** Global

**Topics:** Causes of biodiversity loss, Subsidies, Economic policies, Economic instruments

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**#183.** Stone, C. D., Downes, D., & de Fontaubert, A. C., (1998), *Biodiversity, trade and the fisheries sector, Case Study: West Africa*. IUCN - The World Conservation Union. 50 pp. <http://www.biodiversityeconomics.org>

In 1997, IUCN-The World Conservation Union, with the financial support of the German Federal Ministry for Economic Co-operation and Development, initiated a project to examine the relationship between the Convention on Biological Diversity (CBD) and the rules of international trade—those administered by the World Trade Organisation (WTO), in particular. The project was motivated by a widely shared concern that the aims of the CBD, which are essentially to conserve and equitably distribute the benefits of the environment, might be undermined by the WTO, which aims at the liberalisation of trade. Liberalised trade has the potential to integrate economies, regionally and globally, in mutually beneficial ways. But some observers are concerned that it may do so at a cost of impairing the environment and amplifying disparities in wealth, much of which, in poorer nations, is disproportionately represented in endowments of natural resources. Other commentators have claimed to locate synergistic potential, suggesting, for example, that trade law's anti-subsidy disciplines might be conscripted into the campaign against environmental abuses such as over-fishing. 1 Can the agenda of the two regimes be reconciled—with each other and with other major regimes shaping international relations, such as the Law of the Sea? To foster a concrete discussion, the Project Advisors launched three Case Studies. The studies are designed to identify how the institutional tensions might be affecting sustainable development of resources in the field.

**Coverage:** Africa

**Ecosystem or sector focus:** Fisheries, Marine and coastal, Wetlands

**Topics:** Trade, Convention on Biological Diversity

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**#184.** Stone, D., Ringwood, K., & Vorhies, F., (1997), *Business and Biodiversity: A Guide for the Private Sector*. World Business Council for Sustainable Development and IUCN - The

World Conservation Union: Gland. 68 pp. ISBN 2-8317-0404-9

The world's biological resources are used every day by industry – the agricultural, pharmaceutical and forestry industries to mention but three. However, the Earth's resources are limited and concern has been growing about the way in which they have been managed. This guide has been devised specifically to represent business interests, to tell business people how to become more engaged in implementing the Convention, and to encourage the private sector to contribute its valuable experience to the process under way. To achieve this, the guide proposes a medium-term work program for business. The information in this guide is both theoretical and practical and has been designed to be as relevant to the chief executive officer as it is to corporate or environmental affairs managers or local site managers. The guide's aim is to explain why business should be involved in the biodiversity debate and to suggest how it can participate.

**Coverage:** Global

**Topics:** Private sector, Financial mechanisms, Trade, Economic instruments

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**#185.** Stonich, S., (1995), 'Development, rural impoverishment and environmental destruction in Honduras', In M. Painter, & W. Durham Eds.), *The Social Causes of Environmental Destruction in Latin America*. University of Michigan Press: Ann Arbor.

There is a long history of rapid shifts between different export crops in Southern Honduras, primarily driven by the changing demands of international markets, and the government policy of promoting the expansion of export crops in order to generate foreign exchange. These export crop shifts have included, since the 1940s, cotton, cattle, shrimp and melon farming. Each new agricultural boom has increased the concentration of land, driving small farmers off more fertile lands in favour of large commercial producers, and increasing the rates of land clearance, use of agro-chemicals and the intensity and continuity of cultivation. In turn, these changes in land use and ownership have led to greater economic inequality and environmental degradation.

**Coverage:** Latin America

**Contains examples or case studies from:** Honduras

**Ecosystem or sector focus:** Agriculture

**Topics:** Trade, Economic policies, Economic instruments, Subsidies, Causes of biodiversity loss

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**#186.** Swallow, B. M., & Bromley, D. W. (1995). 'Institutions, governance and incentives in common property regimes for African rangelands', *Environment and Resource Economics* 6 (2):99-118

The general distinctions between open access, state property, common property and private property are now well established in the academic literature. When applied to African rangelands, however, common property admits a wide variety of resource management regimes. To formulate effective policies it is necessary to understand the structure and operations of particular regimes. This paper discusses three examples of common property regimes, two from the southern African nation of Lesotho and one from the west African nation of Senegal, to illustrate some of the key characteristics of common property regimes. In particular, it is important to understand the structure of governance, the types of institutions that govern behaviour, and the compatibility between governance, institutions and individual incentives. A common property regime can only be effective if its institutions are compatible with the structure of governance. The extent of its effectiveness also depends upon the incentives and expectations of individuals expected to enforce the rules of the institutions or comply with their terms. At present, most African governments lack the organisational capacity and political will necessary to implement state property regimes, official regulations on resource use, or individual property rights for rangelands resources. In many cases it is more appropriate for governments to define and enforce group rights to particular resources, than help to establish conditions in which internal group dynamics yield efficient resource management outcomes.

**Coverage:** Africa

**Contains examples or case studies from:** Senegal, Lesotho

**Ecosystem or sector focus:** Drylands, Agriculture

**Topics:** Incentive measures, Economic instruments, Economic policies



**#187.** Swanson, T., (1995), *The Theory and Practices of Transferring Development Rights: The Institutions for Contracting for Biodiversity*. Paper presented at IUCN Workshop on Financing Biodiversity Conservation Harare, Zimbabwe 13-15 September 1995. 17 pp.  
<http://www.biodiversityeconomics.org>

This study explains why the theory of transferable development rights, runs into difficulty because of the lack of legal bases and institutions for the transfer. The problem, in brief is that while ownership rights at a domestic level can be "un-bundled" though legal agreements such as leases or land zoning, the same can not be accomplished across borders. This model runs into problems when applied to a case of international transfers, where there is no reciprocity (as in agreements where both countries agree to conserve similar portions of wetlands or forests). Transferring use-rights in land to a foreign entity could not be legally enforced. Swanson instead suggests that the model to adopt is that of the franchise, in which three parties are involved: the global community, owner states, and land-owners. The author also suggests what institutions would be needed to enforce these contracts.

**Coverage:** Global

**Topics:** Economic instruments, Financial mechanisms, Markets and charges

**#188.** Swanson, T., (1996), *The Underlying Causes of Biodiversity Decline: An Economic Analysis*. Paper presented at IUCN Workshop on Economics of Biodiversity Loss, April 1996, Gland, Switzerland. 14 pp.

This paper opens with the premise that all of the various examples of biodiversity loss are consequences of human and societal choices and that humans should be seen as being fundamentally responsible for all of the various forms of biodiversity decline by reason of their choices regarding the allocation of resources. The paper commences by setting forth the original economic framework utilised to explain over exploitation-based resource depletion, and then goes on to demonstrate how this "irresponsible" behaviour may be incorporated within a more fundamental theory of human choice regarding resource allocation and biodiversity depletion. This theory is then developed in order to

demonstrate how each of the various phenomena associated with biodiversity loss is a proximate cause of biodiversity decline resulting from fundamental human choices concerning the allocation of the resources required for continued survival. The paper argues that economic forces drive biodiversity losses which implies the conclusion that the assessment of biodiversity decline requires an understanding and assessment of these economic forces. In order to redress the decline of diversity it will be necessary to reshape the economic incentives that cause human societies to choose systematically to reshape the living world in the way that they do.

**Coverage:** Global

**Topics:** Incentive measures, Disincentives, Subsidies, Causes of biodiversity loss, Economic policies

**#189.** Tan, J., (1998), *Environmental Foundations: Funding Community Innovations in Biodiversity Conservation*. Paper presented at a workshop on Financial Innovations for Biodiversity, 10th Global Biodiversity Forum, Bratislava, Slovakia, 1-3 May 1998. 7 pp.

Environmental foundations managing relatively large funds for environmental projects are providing access to international funds for local NGOs. These foundations, considered as National Environmental Fund holders or NEFs are able to act as conduit for international funds to be distributed to local, particularly, community based NGOs or people's organisations (POs). The Foundation for the Philippine Environment or FPE is one of seven NEFs in the Asia-Pacific Region. The Establishment of FPE was an initiative of the Philippine and U.S. NGOs with the support of the governments of the two countries. In 1990, a Memorandum of Agreement between the Philippines and U.S. governments established the Natural Resources Management Program to support NGO activities for the purpose of creating an endowed, private, non-profit foundation for the environment. In April 1991, USAID and WWF/US signed a co-operative agreement to complete the first of two debt-for-nature swaps amounting to USD 5 million, planned for a total of USD 25 million. In January 1992, FPE was officially registered with the Securities and Exchange Commission. In March 1993, a Memorandum of Understanding was concluded among the governments of the

Philippines (represented by the Department of Finance) and the U.S. (represented by USAID/Manila) and FPE for the establishment of the endowment. In September 1993, the second debt-for-nature swap was concluded for USD 13 million. A subsequent debt-for-nature swap financed by the Bank of Tokyo cost USD 104 thousand. Under its agreement with USAID, FPE's endowment fund was initially managed by WWF/US. In June 1994, the endowment fund was formally transferred to FPE's management, making FPE an independent institution. Actively funding on-the-ground biodiversity conservation programs in the Philippines. The endowment that FPE manages was initially valued at almost USD 22 million converted immediately into Philippine Pesos at almost 570 million. FPE vision is of an "ecologically balanced, clean and healthy environment with communities living fully and caring responsibly for their environment."

**Coverage:** Asia

**Contains examples or case studies from:** Philippines

**Ecosystem or sector focus:** Protected Areas

**Topics:** Financial mechanisms, Debt conversion, Trust Funds

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**#190.** Tejam, C., & Ross, A., (1997), *Manual of Practices: Contingent Valuation Survey for Integrated Coastal Management Applications*. GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas: Quezon City.

This manual outlines the steps and methods in conducting contingent valuation study. It describes a contingent valuation survey used to assess the perceived conservation value of Batangas Bay in the Philippines, and the willingness of coastal dwellers to pay for this conservation. This included questions about the amount that householders would be willing to increase their garbage collection and sewage treatment payments so as not harm the marine environment, their willingness to pay fees to maintain fisheries resources and to contribute towards coral reef conservation. Results of the survey indicated people's willingness to pay for actions to conserve the marine environment - the value that they place on various attributes of Batangas Bay.

**Coverage:** Asia

**Contains examples or case studies from:** Philippines

**Ecosystem or sector focus:** Marine and coastal, Urban settlements, Industry, Infrastructure

**Topics:** Valuation  
Contingent valuation

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**#191.** Tietenberg, T., (1995), 'Design lessons from existing air pollution control systems: the case of the United States', In S. Hanna, & M. Munasinghe (Eds.), *Property Rights in a Social and Ecological Context: Case Studies and Applications*. Beijer International Institute of Ecological Economics and World Bank: Stockholm and Washington DC.

Beginning in 1975, the Environmental Protection Agency in the USA has piloted various incentives schemes together known as the "Emissions Trading Program". Here, the introduction of tradable permits for emissions are used as incentives for firms to limit the pollution loads they generate, or to force polluting industries to pay for the emissions they discharge. One of the first steps was to allow firms which reduced emissions below that required by their standards to gain an emissions reduction credit, that could then either be offset against emissions created elsewhere by the firm, or sold to other industries. This type of approach was then applied to lead in gasoline, where a fixed amount of lead rights was allocated to oil refiners. Refiners who did not use their full allocation of rights were permitted to sell them to others. Similar systems have since been applied to ozone-depleting chemicals, acid rain-causing electric utility emissions and smog production. More recently, the principle of credit trading has evolved into one of allowance trading. Newer programmes are based on allowances defined in discrete terms, rather than credits for pollutant flows (for example a permit for a certain amount of tons, rather than tons per year, which has to be renewed once used up). The system now also contains a set-aside of allowable permits that they government can sell, should the need arise.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Ecosystem or sector focus:** Urban settlements, Industry, Infrastructure

**Topics:** Economic instruments, Markets and charges

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**#192.** Tobias, D., & Mendelsohn, R. (1991). 'Valuing ecotourism in a tropical rainforest reserve', *Ambio* 20 (2):91-93

This article reports on a study carried out to measure the value of ecotourism at a tropical rainforest site in Costa Rica, using the travel cost method. By observing travel behaviour, the study reveals that Costa Rican visitors are willing to pay considerably for the experience of visiting the site. The current value of the site per hectare, based on domestic and foreign tourism alone, is between 1-2 times higher than the purchase price currently paid by the reserve for the acquisition of new lands.

**Coverage:** Latin America

**Contains examples or case studies from:** Costa Rica

**Ecosystem or sector focus:** Forests, Tourism

**Topics:** Valuation, Travel cost

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**#193.** Totten, M., (1999), *Getting it Right: Emerging Markets for Storing Carbon in Forests*. World Resource Institute: Washington DC. 49 pp. ISBN 1-56973-413-5

This document sets out the potential for businesses and the environmental community to find common solutions that use forests to mitigate the climate-warming dangers of greenhouse gases. It argues that there is an accelerating momentum to create a market for forests as sinks for carbon emissions. Examples of this emerging market in carbon offsets are given from around the world.

**Coverage:** Global, Latin America, Europe, North America, Asia

**Contains examples or case studies from:** Costa Rica, Belize, Paraguay, Bolivia, Malaysia, USA, Brazil, Australia, Mexico, Honduras, Netherlands

**Ecosystem or sector focus:** Forests, Watersheds

**Topics:** Climate change, Markets and charges, Financial mechanisms, Economic instruments, Deforestation, Carbon offsets, Payments for environmental services

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**#194.** Tressler, S., (1995), *Charitable Giving in the United States: A Model and Opportunity for Funding Conservation of Biodiversity*. Paper presented at IUCN Workshop on Financing Biodiversity Conservation Harare, Zimbabwe 13-15 September 1995. 7 pp.

The purpose of this paper is to explore trends in charitable giving that suggest opportunities to support conservation of biodiversity around the world. The level of charitable giving in the United States, which totalled \$129.88 billion in 1994, suggests that serious consideration should be given to developing this source of funding for conservation of biodiversity. The U.S. model could be replicated in other developed countries and emerging economies. The latter presents a particular opportunity to build philanthropic traditions as economies grow.

**Coverage:** North America

**Contains examples or case studies from:** USA

**Topics:** Taxes, Economic instruments, Financial mechanisms

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**#195.** Trexler, M., (1995), *Biodiversity Conservation Through Joint Implementation: Advancing Common Agenda Elements*. Paper presented at IUCN Workshop on Financing Biodiversity Conservation Harare, Zimbabwe 13-15 September 1995. 7 pp.

This paper reviews the successes and difficulties of Joint Implementation of carbon offset projects for forest conservation. This paper considers only one method used for carbon offsets, but this method is considered to be the one which has the greatest impact on biodiversity conservation. The Joint Implementation concept in the Convention on Climate Change (CFF) has led to a pilot phase, which this author argues should be developed to provide strong incentives for private sector industry (power plants, manufacturers) to endorse offsets as alternatives to facility-specific emissions reductions. Several industry-financed offset projects are briefly summarised. However offset projects face important barriers, notably the

burden of proving that preservation will result in carbon offset rather than displace the destruction of the forest elsewhere. The author calls for a strengthening of policy frameworks to enable JI projects to overcome barriers, and suggests seven key points to address in the design of future JI projects.

**Coverage:** Global

**Ecosystem or sector focus:** Forests

**Topics:** Climate change, Private sector, Financial mechanisms, Economic instruments

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**#196.** Trexler, M., (1999), *Innovative Forest Financing Options and Issues: Forest Conservation and Management for Climate Change Mitigation*. Programme on Forests, United Nations Development Programme: New York. 69 pp.

This issues paper focuses on one potential innovative financing mechanism for sustainable forest management activities - the Clean Development Mechanism. It covers the background to the climate change issue, looks at different options for integrating forest and land-use based options into the SDM and gives examples of ongoing forestry projects being pursued for climate change mitigation purposes. The strengths and weaknesses of different financing mechanisms and strategies are assessed.

**Coverage:** Global, Asia, Latin America

**Contains examples or case studies**

**from:** Guatemala, Costa Rica, Paraguay, Ecuador, Peru, Bolivia, Mexico, Belize, Malaysia

**Ecosystem or sector focus:** Forests

**Topics:** Financial mechanisms, Economic instruments, Private sector, Climate change, Carbon offsets

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**#197.** Tri, N. H., Adger, W. N., Kelly, M., Granich, S., & Ninh, N. H., (1996), *The Role of Natural Resource Management in Mitigating Climate Impacts: Mangrove Restoration in Vietnam*. Working Paper GEC 96-06, Centre for Social and Economic Research on the Global Environment: London. 27 pp.

The risk that tropical storm occurrence may alter as a result of global warming presents coastal managers with a serious challenge. This paper

examines a strategy to protect coastal populations and resources against these effects, based on the rehabilitation of a natural ecosystem, the mangrove. It quantifies the economic benefits of mangrove rehabilitation undertaken to enhance sea defence systems in three coastal districts of northern Vietnam. The results of this analysis show that mangrove rehabilitation can be desirable from an economic perspective solely on the direct use benefits by local communities. Such activities have even higher benefit:cost ratios with the inclusion of the indirect benefits resulting from the avoided maintenance costs for the sea dike systems which the mangroves protect from coastal storm surges.

**Coverage:** Asia

**Contains examples or case studies**  
**from:** Vietnam

**Ecosystem or sector focus:** Marine and coastal

**Topics:** Climate change, Valuation, Market valuation, Effect on production, Mitigative and avertive expenditures

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**#198.** t'Sas Rolfes, M., (1995), *Private Sector Mechanisms for Financing Biodiversity Conservation: Some Lessons From Southern Africa*. Paper presented at IUCN Workshop on Financing Biodiversity Conservation Harare, Zimbabwe 13-15 September 1995. 11 pp.

<http://www.biodiversityeconomics.org>

There are two approaches to overcoming the "missing markets" for biodiversity: either internalise the externalities of conservation, the approach favoured by most multilateral bodies, or create a market. This paper explains why market mechanisms have greater promise of succeeding in Southern Africa, despite the opposition of supporters of species preservation. It backs up this argument with a case study of the South African ecotourism company Conservation Corporation (ConsCorp). By giving private or communal landowners the right to sell the products of biodiversity on markets there is an incentive to conserve - where strict efforts to preserve the same species creates no such incentive. Given the right legal framework, the market can do a better job than either the state, or foreign NGO's. Who presently invests in conservation? Investors include mining



corporations, livestock and game ranchers, wealthy individuals seeking the tax breaks afforded to farmers, and most recently environmental entrepreneurs such as Conscorp.

**Coverage:** Africa

**Contains examples or case studies from:** South Africa

**Ecosystem or sector focus:** Protected Areas, Wildlife, Tourism

**Topics:** Financial mechanisms, Private sector

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**#199.** t'Sas Rolfes, M., (1996), *The Use of Auctions as an Incentive Measure for Wildlife Conservation*. Paper presented at workshop on Incentives for Biodiversity: Sharing Experiences, 4th Global Biodiversity Forum, Montreal, Canada 30 August - 1 September 1996. 3 pp.

This paper highlights the success of public game auctions as a means of providing incentives for wildlife conservation in South Africa. The initial experiences of the National Parks Board in selling White Rhinos to the private sector were not successful for conservation because the set price of purchasing a rhino from the NPB was significantly less than the price obtained from trophy hunters. Once auctioning was introduced as a pricing mechanism the purchasing price rose and private landowners had the incentive to breed their own rhino populations. This paper reviews the case and provides a summary of 'lessons learned'.

**Coverage:** Africa

**Contains examples or case studies from:** South Africa

**Ecosystem or sector focus:** Wildlife, Protected Areas

**Topics:** Incentive measures, Economic instruments, Financial mechanisms, Markets and charges

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**#200.** Turpie, J., Smith, B., Emerton, L. A., & Barnes, J., (1999), *The Economic Value of the Zambezi Basin Wetlands*. IUCN - The World Conservation Union, Regional Office for Southern Africa: Harare. 346 pp.

This reports on a study carried out to value the Zambezi Basin wetlands in Southern Africa. It presents an overview of the theoretical

background to economic valuation, and the available methods and techniques for valuation. It looks in detail at four major wetland sites and presents monetary estimates of their direct and indirect values. The impacts of macroeconomic and sectoral economic policies on wetland status are analysed, and recommendations made for the use of economic instruments and incentives for wetland wise use and sustainable management.

**Coverage:** Africa

**Contains examples or case studies from:** Zimbabwe, Zambia, Namibia, Botswana, Malawi, Mozambique

**Ecosystem or sector focus:** Marine and coastal, Drylands, Wetlands, Water

**Topics:** Valuation, Contingent valuation, Market valuation, Effect on production, Mitigative and avertive expenditures, Replacement costs, Economic instruments, Economic policies, Disincentives, Incentive measures, Causes of biodiversity loss

**Other:** Executive summary also in Portuguese.

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**#201.** Umana, M. R., (1996), *Conservation Strategies and Incentive Mechanisms Implemented Within the La Amistad Conservation Development Initiative for Costa Rica and Panama*. Paper presented at workshop on Incentives for Biodiversity: Sharing Experiences, 4th Global Biodiversity Forum, Montreal, Canada 30 August - 1 September 1996. 5 pp.

<http://www.biodiversityeconomics.org>

Based on the experiences of the La Amistad Conservation and Development Initiative, this paper outlines several methods undertaken by that group to conserve and sustainably use the resources of La Amistad Biosphere Reserve. These efforts include a revolving credit fund, tree nurseries, diversification of crops, the establishment of market opportunities, reducing soil erosion, providing technical training, and enhancing environmental education. These efforts employ a variety of direct and indirect incentives such as subsidies, cost sharing programmes, and agency support. The paper outlines the initiative, the institutional and legal frameworks, the effectiveness of the incentives, and lessons and recommendations.

**Coverage:** Latin America

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**Contains examples or case studies from:** Costa Rica, Panama

**Ecosystem or sector focus:** Forests, Protected Areas

**Topics:** Incentive measures, Financial mechanisms, Trust Funds

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**#202.** UN, (1993), *Integrated Environmental and Economic Accounting*. Department for Economic and Social Information and Policy Analysis, Statistical Division, Studies in Methods Series F No 61, United Nations: New York. 182 pp. ISBN 92-1-161359-0

This handbook presents methods for integrated environmental and economic accounting. It gives a conceptual basis for implementing a satellite national account system for environmental and economic accounting that describes the relationships between the natural environment and the economy. Ultimately, integrated environmental and economic accounting is intended to support integrated social, economic and environmental policy by means of an integrated information system.

**Coverage:** Global

**Topics:** Environmental accounting, Valuation

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**#203.** UNEP (Ed.), (2000), *Funding Protected Areas in the Wider Caribbean: A Guide for Managers and Conservation Organisations*. Proceedings of the Ninth Intergovernmental Meeting on the Action Plan for the Caribbean Environment Programme and Sixth Meeting of the Contracting Parties to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region: Kingston, Jamaica, 14-18 February 2000. 48 pp.

This document is an orientation to sources of funding for protected areas and biodiversity conservation. It is intended to serve as a primer and basic guidelines for protected area agencies and managers, as well as NGOs. It deals both with financing mechanisms and funding sources available for protected areas and biodiversity conservation in the Wider Caribbean. It shows, through case studies and examples from Latin America and the Caribbean, the many ways in which protected area managers have incorporated

different funding sources for establishment and management of parks. The document includes sections in planning for financial sustainability, cross-cutting themes in biodiversity finance, finance and revenue-generating mechanisms and fundraising from international donors. It also presents sources of information and technical assistance for funding protected areas.

**Coverage:** Caribbean, Latin America

**Contains examples or case studies from:** Antigua, Netherlands Antilles, Belize, Costa Rica, British Virgin Islands, Guatemala, Panama

**Ecosystem or sector focus:** Marine and coastal, Protected Areas, Tourism

**Topics:** Financial mechanisms, Economic instruments, Markets and charges, Trust Funds, Debt conversion, Carbon offsets, Bioprospecting, Taxes, Valuation, Private sector

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**#204.** Vallejo, N., & Hauselmann, P., (1998), *From Theory to Practice: Incentive Measures in Developing Countries*. Benefiting from Biodiversity Series, WWF - World Wide Fund for Nature: Gland. 42 pp. ISBN 2-88685-216-1

Five years after the establishment of the Convention on Biological Diversity, the massive degradation of ecosystems continues. Thousands of species have disappeared, the climate is changing. Are the efforts to save the planet without hope? This publication shows, to the contrary, that some initiatives - born and tested in developing countries - are beginning to reverse these trends. It looks at what incentive measures are, and what types of incentive measures are available for biodiversity conservation. Presenting case studies of the introduction and use of incentive measures for biodiversity from a range of countries and ecosystems, the document makes conclusions as to successful elements and lessons learned in the design and use of incentive measures for biodiversity conservation.

**Coverage:** Global, Africa, Asia, Latin America

**Contains examples or case studies from:** Brazil, Kenya, Colombia, Cameroon, Cote d'Ivoire, Uganda, India, Malaysia

**Ecosystem or sector focus:** Forests, Tourism

**Topics:** Taxes, Subsidies, Economic instruments, Incentive measures, Financial mechanisms, Economic policies, Private sector, Causes of biodiversity loss

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**#205.** van Tongeren, J., Lutz, E., & Shweinfest, S., (1991), *Integrated Environmental and Economic Accounting: A Case Study for Mexico*. Environment Working Paper 50, Environment Department, World Bank: Washington DC. 34 pp.

This document presents a case study of the application of environmental accounting to Mexico using the integrated environmental and economic accounting framework developed by the United Nations Statistical Office. Depreciation of produced asset balances was calculated and deducted from the GDP to arrive at the standardised NDP. Depletion of oil was accounted for, and degradation concerns were addressed. These effects were valued. Environmentally adjusted NDP ranged from 94% of traditional NDP to 87% when deducting the cost of degradation.

**Coverage:** Latin America

**Contains examples or case studies from:** Mexico

**Ecosystem or sector focus:** Agriculture, Forests, Industry

**Topics:** Environmental accounting, Valuation

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**#206.** Windevoxxel, N., (1992), *Valoracion Economica Parcial de los Manglares de la Region II de Nicaragua*. Unpublished Tesis de Magister Scuintiae, Turrialba, Costa Rica:

The value of mangroves of Héroes y Martínez on the North Pacific coast of Nicaragua was valued by looking at loss of local income and productivity resulting from deforestation. The survey looked at the value of direct uses of artisanal forestry, fishing and mollusc extraction, and related fall in availability and yield to loss of mangroves. It then builds up ecological-economic models to assess values under different mangrove exploitation scenarios.

**Coverage:** Latin America

**Contains examples or case studies from:** Nicaragua

**Ecosystem or sector focus:** Marine and coastal, Forests, Fisheries

**Topics:** Valuation, Effect on production, Market valuation

**Other:** Spanish language publication

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**#207.** Winpenny, J. T., (1991), *Values for the Environment: A Guide to Economic Appraisal*. HMSO Press: London. 277 pp. ISBN 0-11-580257-6

This practical guide to the economic treatment of environment in project appraisal uses cost-benefit analysis as the decision framework. The main environmental impacts of projects and the methods available for placing economic values on them are discussed, and the feasibility of environmental valuation for projects is then illustrated for a range of sectors, ecosystems and countries. The guide concludes with a review of relevant policy issues.

**Coverage:** Global, Africa, Asia, Latin America, Middle East and North Africa, North America

**Contains examples or case studies from:** Nepal, Morocco, Indonesia, El Salvador, Mali, Australia, Nicaragua, USA, Cameroon, Lesotho, Korea, Ethiopia, Nigeria, Botswana, Philippines, Ecuador, Kenya, Thailand, Egypt, China, Colombia, Brazil, Sudan

**Topics:** Valuation, Economic instruments, Economic policies, Contingent valuation, Market valuation, Effect on production, Replacement costs, Mitigative and averted expenditures

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**#208.** Winpenny, J. T., (1995), *The Economic Appraisal of Environmental Projects and Policies*. Organisation for Economic Co-operation and Development: Paris. 171 pp. ISBN 92-64-14583-4

Economic appraisal of environmental impacts is a key element of the decision to invest in new projects and policies. Several methods exist for carrying out these appraisals. The purpose of this technical guide is to explain to policy analysts and decision makers the basic principles, fields of application, strengths and weaknesses of existing economic evaluation techniques. Case studies are provided from both industrialised and developing countries.

**Coverage:** Global, Africa, Australia and New Zealand, Europe, Asia, Latin America

**Contains examples or case studies**

**from:** South Africa, Mali, India, Cameroon, China, Nigeria, Zimbabwe, Kenya, USA, Costa Rica, India, UK, Djibouti

**Ecosystem or sector focus:** Agriculture, Water, Wetlands, Forests, Protected Areas, Wildlife, Industry, Infrastructure, Urban settlements

**Topics:** Valuation, Economic instruments, Economic policies, Disincentives, Causes of biodiversity loss, Financial mechanisms, Taxes, Subsidies, Land degradation, Soil erosion, Pollution

**Other:** Also published in French.

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**#209.** WRI, (2000a), *Financing Biodiversity Conservation*. World Resources Institute, Washington DC. <http://www.wri.org>

Innovative funding mechanisms will be required to support conservation efforts. These mechanisms should be based on the principle that those who benefit from biological resources should pay more of the costs of ensuring that such resources are used sustainably. Efforts are required at the community level to provide economic incentives for conservation, at the national level to ensure that the government policies are compatible with such incentives, and at the international level to ensure that the wealthy nations benefiting from the biological resources of the tropics are able to invest in conserving the productive capacity of those resources.

**Coverage:** Global

**Topics:** Financial mechanisms, Convention on Biological Diversity

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**#210.** WRI, (2000b), *Valuing Ecosystem Services*. World Resources Institute, Washington DC. <http://www.wri.org>

What are Mother Nature's life-support services worth? In one sense, their value is infinite. The Earth's economies would soon collapse without fertile soil, fresh water, breathable air, and an amenable climate. But "infinite" too often translates to "zero" in the equations that guide land use and policy decisions. Practitioners in the young field of ecological economics believe more concrete numbers are required to help nations avoid unsustainable economic choices that

degrade both their natural resources and the vital services that healthy natural ecosystems generate.

**Coverage:** Global

**Topics:** Valuation, Incentive measures, Financial mechanisms, Convention on Biological Diversity

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