

Investing in Environmental Wealth for Poverty Reduction

Annotated Bibliography



Prepared on behalf of the Poverty-Environment Partnership by

IUCN
The World Conservation Union

www.biodiversityeconomics.org/MDGs

Disclaimer

This publication is a joint product of staff from The World Conservation Union (IUCN), the International Institute for Environment and Development (IIED), and an independent consultant, prepared by IUCN on behalf of the Poverty-Environment Partnership (PEP).

The views expressed herein do not necessarily reflect those of their respective governing bodies, or when applicable, the countries there represented.

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Other Poverty-Environment Partnership publications

1. Sustaining the Environment to Fight Poverty and Achieve the MDGs. The economics case and priorities for action. (Executive Summary) (2005)
<http://www.undp.org/pei/pdfs/SustainingEnvironmentFightPoverty.pdf>
2. Investing in Environmental Wealth for Poverty Reduction (2005)
<http://www.undp.org/pei/pdfs/InvestingEnvironmentalWealthPovertyReduction.pdf>
3. Assessing Environment's Contribution to Poverty Reduction (2005)
<http://www.undp.org/pei/pdfs/AssessingEnvironmentsRoleinPovertyReduction.pdf>
4. Linking Poverty Reduction and Environmental Management: Policy Challenges and Opportunities (2002) <http://www.undp.org/pei/pdfs/LPREM.pdf>
5. Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation (2003)
<http://web.worldbank.org/servlets/ECR?contentMDK=20480614&sitePK=406964>
6. Environmental Fiscal Reform for Poverty Reduction (2005)
<http://www.oecd.org/dataoecd/14/25/34996292.pdf>

About the Poverty-Environment Partnership

The Poverty-Environment Partnership (PEP) is a network of bilateral aid agencies, multilateral development banks, UN agencies and international NGOs that aims to address key poverty-environment issues within the framework of international efforts to achieve the Millennium Development Goals. Analytical work and knowledge-sharing activities undertaken by the PEP since 2001 points to three broad, fundamental lessons that underpin efforts to link poverty reduction and environmental management:

- The environmental quality of growth matters to people living in poverty;
- Environmental management cannot be treated separately from other development concerns;
- People living in poverty must be seen as part of the solution rather than part of the problem.

PEP Member Organizations: Bilateral Agencies: Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Japan, Netherlands, Norway, Sweden, Switzerland, United Kingdom, United States. Multilateral/UN Agencies: African Development Bank, Asian Development Bank, European Commission, UN Food and Agriculture Organization, Inter-American Development Bank, International Fund for Agricultural Development, International Monetary Fund, Organization for Economic Cooperation and Development, UN Department for Economic and Social Affairs, UN Development Programme, UN Environment Programme, The World Bank, World Health Organization. International NGOs: International Institute for Environment and Development, IUCN-The World Conservation Union, World Resources Institute, WWF International.

More information on the PEP can be found at www.povertyenvironment.net/pep.

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1. Introduction

The PEP/MDG economic analysis was successfully presented at the UN World Summit on 14 September 2005 in New York City (<http://www.undp.org/pei/>). As a follow-up to this event and the accompanying publications, and under an agreement with UNDP/UNOPS, IUCN-The World Conservation Union has compiled this bibliography of case studies and other documents, building on material included in the PEP report by the late Prof. David Pearce of University College London.

The case studies (or syntheses of cases) were sought to illustrate the linkages between poverty and environment and are organized thematically as outlined in the table of contents. In addition, documents which focus on specific MDGs are highlighted.

The synthesis report prepared by Prof. Pearce adopts a complementary structure, based on a conceptual model of the linkages between poverty and environment. His report provided a guide for selecting case studies and identifying their salient findings. A priority for the selection of case studies or syntheses was the availability of data on the economic rate of return or cost-effectiveness of environmental interventions.

All case studies highlighted in **bold** can be downloaded in full-text versions from the electronic library at www.biodiversityeconomics.org.

Further information can be found at www.biodiversityeconomics.org/MDGs.

2. Environment and Development

This section contains references on the following issues:

- Poverty and environment linkages
- Mainstreaming environment in development policies and strategies
- The Millennium Development Goals (MDGs)
- Health and education
- Income, growth and poverty
- Governance, institutions and social capital

2.1 Poverty and environment

Barbier, E. 1999. Poverty, environment and development. In J. van den Bergh (ed). The Handbook of Environmental and Resource Economics. Cheltenham: Edward Elgar: 731-744

Barbier, E. 2006. Natural capital, resource dependency and poverty in developing countries: the problem of “dualism” within “dualism.” In R. Lopez and M Toman (eds), Environment and Sustainable Development. Oxford: Oxford University Press

Boyce, J.K., 2003. Inequality and Environmental Protection. Working Papers wp52, Political Economy Research Institute. Amherst: University of Massachusetts

<http://www.umass.edu/peri/pdfs/WP52.pdf>

Social and economic inequalities can influence both the distribution of the costs and benefits from environmental degradation and the extent of environmental protection. When those who benefit from environmentally degrading economic activities are powerful relative to those who bear the costs, environmental protection is generally weaker than when the reverse is true. This can lead to environmental inequalities along lines of class, race, ethnicity, gender, and age. At the same time, inequalities may affect the overall extent of environmental quality. There are good theoretical reasons to expect inequalities to reduce environmental protection and exacerbate environmental degradation. The available empirical evidence generally is consistent with this expectation.

Buys, P., K. Chomitz, S. Dasgupta, U. Deichmann, B. Larsen, C. Meisner, J. Nygard, K. Pandey, N. Pinnoi and D. Wheeler. 2004. The Economics of Regional Poverty-Environment Programs: An Application to the Lao People's Democratic Republic. Policy Research Working Paper 3267. Washington, D.C.: World Bank

Cavendish, W. 2000. Empirical regularities in the poverty-environment relationship of rural households: evidence from Zimbabwe. World Development 28 (11): 1979-2003

Dasgupta, P. 2000. Valuation and Evaluation: Measuring the Quality of Life and Evaluating Policy, Discussion Paper 00-24, Resources for the Future, Washington, D.C.

Dasgupta, P. 2001. Human Well-being and the Natural Environment, Oxford: Oxford University Press.

Dasgupta, S., U. Deichmann, C. Meisner and D. Wheeler. 2005. Where is the poverty-environment nexus? Evidence from Cambodia, Lao PDR and Vietnam. World Development. 33 (4): 617-638

Can be purchased from <http://www.sciencedirect.com/science/article/B6VC6-4FPDRGC-4/2/f819496c19b97018c0caa6c8dbbe3943>

This paper investigates the poverty–environment nexus at the provincial and district levels in Cambodia, Lao PDR, and Vietnam. The analysis focuses on spatial associations between poverty populations and five environmental problems: deforestation, fragile soils, indoor air pollution, contaminated water, and outdoor air pollution. The results suggest that the nexus is quite different in each country. We conclude that the nexus concept can provide a useful catalyst for country-specific work, but not a general formula for program design. Joint implementation of poverty and environment strategies may be cost effective for some environmental problems, but independent implementation may be preferable in many cases as well.

Duraiappah, A. 2004. Human Well-being, Poverty and Ecosystem Services: Exploring the Links. UNEP and IISD

<http://www.iisd.org/publications/pub.aspx?pno=644>

Exploring the Links sets out to demonstrate how human well-being is dependent upon ecosystems and ecosystem services; to identify barriers and drivers that prevent the poor from using these ecosystem services to improve their well-being, in essence perpetuating poverty; and to identify policy response options to remove the barriers, re-design or even introduce new intervention strategies to allow the poor to improve their well-being through an ecosystem approach.

Duraiappah, A.K., 1998: Poverty and Environmental Degradation: A Review and Analysis of the Nexus. *World Development*, 26(12), 2169-2179

Eskeland, G. and C. Kong. 1998. Protecting the Environment and the Poor. Development Research Group. Washington, D.C.: World Bank

Harbaugh, W., A. Levinson and D Wilson. 2002. Re-examining the empirical evidence for an environmental Kuznets curve. *Review of Economics and Statistics*. 84(3): 541-551

Can be purchased from <http://www.mitpressjournals.org/>

This paper uses an updated and revised panel data set on ambient air pollution in cities worldwide to examine the robustness of the evidence for the existence of an inverted U-shaped relationship between national income and pollution. We test the sensitivity of the pollution-income relationship to functional forms, to additional covariates, and to changes in the nations, cities, and years sampled. We find that the results are highly sensitive to these changes, and conclude that there is little empirical support for an inverted U-shaped relationship between several important air pollutants and national income in these data.

Heady, C. 2000. Natural resource sustainability and poverty reduction. *Environment and Development Economics*. 5: 241-258

Heal, G. 2004. Economics and biodiversity: an introduction. *Resource and Energy Economics*. 26(2): 105-114

Kahn, M. 2003. The Death Toll from Natural Disasters: The Role of Income, Geography and Institutions. Fletcher School of Law and Diplomacy. Medford MA: Tufts University. Mimeo

López, R. 1998. Where development can or cannot go: the role of poverty-environment linkages. In B. Pleskovich and J. Stiglitz (eds). *Annual World Bank Conference on Development Economics 1997*. Washington, D.C.: World Bank: 285-306

López, R. and C. Scoseria. 1996. Environmental sustainability and poverty in Belize: a policy paper. *Environment and Development Economics*, 1. 289-307

Mabey, N. 1998. Poverty Elimination and the Environment. Godalming: WWF

Mäler, K. -G. 1997. Environment, poverty and economic growth. In B. Pleskovic and J. Stiglitz (eds). *Annual World Bank Conference on Development Economics*. Washington, D.C.: World Bank

Mink, S. 1993. Poverty, Population and the Environment. Washington, D.C.: World Bank

Narain, U., S. Gupta and K. van't Veld. 2005. Poverty and the Environment: Exploring the Relationship between Household Income, Private Assets, and Natural Assets. Discussion Paper 05-18. Washington, D.C.: Resources for the Future

<http://www.cgdev.org/doc/event%20docs/Narain-Poverty%20and%20the%20Environment.pdf>

Using purpose-collected survey data from 537 households in 60 different villages of the Jhabua district of India, this paper investigates the extent to which rural households depend on common-pool natural resources for their daily livelihood. Previous studies have found that resource dependence—defined as the fraction of total income derived from common-pool resources—strongly decreases with income. This study finds a more complex relationship which suggests that the quality of natural resources matters to a larger share of the rural population than had been previously believed; common-pool resources contribute a significant fraction of the income not just of the desperately poor, but also of the relatively rich.

Panayotou, T. 1997. Demystifying the environmental Kuznets curve: turning a black box into a policy tool. *Environment and Development Economics*. 2: 465-484

Papyrakis, E. and R. Gerlagh, 2004. The Resource Curse Hypothesis and its Transmission Channels. Journal of Comparative Economics, Vol. 32 (1) pp. 181–193

http://130.37.129.100/ivm/organisation/staff/papers/Papyrakis_and_Gerlagh.pdf

We examine empirically the direct and indirect effect of natural resource abundance on economic growth. We find that natural resources have a negative impact on growth when considered in isolation, but a positive (direct) impact on growth when we include in the analysis various other explanatory variables such as corruption, investments, openness, terms of trade, and schooling. We study the transmissions channels, that is the effect of natural resources on the other explaining variables, and calculate, for each transmission channel, the indirect effect of natural resources on growth. The negative indirect effects of natural resources on growth are shown to outweigh the positive direct effect by a magnitude.

Pearce, D. W and E Barbier. 2000. Blueprint for a Sustainable Economy. London: Earthscan

Pillai, P., 2001. Poverty and Environment: a Thematic Bibliography. Washington, D.C.: World Bank, mimeo

Prakash, S. No date. Poverty and Environment Linkages in Mountains and Uplands: Reflections on the Poverty Trap Thesis. London: IIED

Sachs, J. and A. Warner. 2001. The curse of natural resources. European Economic Review. 45: 827-838

Sanderson, S. 2005. Poverty and conservation: The new century's "peasant question". World Development. 33 (2): 323-332

http://edcintl.cr.usgs.gov/SEMSOC/uploads/File/Sanderson_peasant05.pdf

By issuing its Millennium Development Goals, the United Nations has declared its intention to alleviate poverty and hunger at a global scale over the next decade. But, the perspectives and policies to achieve those goals have not addressed the failures of previous development efforts of this kind. Nor have the plans to meet the Millennium Development Goals paid sufficient attention to the costs of rural development for wild nature. This paper points up the absence of a new analytical framework for sustainability and an action program in favor of a poverty- and conservation- oriented rural development program to ensure that the benefits of multilateral development plans accrue to the truly poor and to the future of wild nature.

Scherr, S. 2000. A downward spiral? Research evidence on the relationship between poverty and natural resource degradation. Food Policy. 25: 479-498

2.2 Mainstreaming environment in policies and strategies

ADB, 2002. Environment Policy: Asian Development Bank. Manila: ADB.

ADB, AfDB, BMZ, DFID, DGIS, EC, GTZ, OECD, UNEP, UNDP and World Bank 2003. Poverty and Climate Change: Reducing the vulnerability of the poor through adaptation. UK: Department for International Development (DFID).

Part 1 at <http://www.undp.org/energy/docs/poverty-and-climate-change-72dpi-part1.pdf>

Part 2 at <http://www.undp.org/energy/docs/poverty-and-climate-change-72dpi-part2.pdf>

Examines how climate change is likely to affect the existing vulnerability of poor people to climate-related impacts drawing from IPCC 2001 but also some other sources eg: Gallup and Sachs 2000 – Using modelling based on IPCC scenarios they predict that temperature rise by 2100 will lead to increases in potential breeding grounds for malaria in parts of Brazil, Southern Africa and the Horn of Africa but malaria risk may fall in parts of Namibia and the West African Sahel because of excessive heat.

Agarwal, A. and C. Gibson, 1999. Enchantment and Disenchantment: The role of community in natural resource management. World Development, Vol. 27, No. 4, pp. 629-649.

Auty, R.M., 2001. Resource Abundance and Economic Development. Oxford University Press.

Auty, R.M., 2004. Patterns of Resource Extraction and Deployment in Developing Countries: Implications for governance, economic policy and performance. Presented at the Poverty Reduction and Economic Management (PREM) seminar, World Bank, Washington DC, April 27, 2004.

Baland, J. and J. Platteau, 1999. The Ambiguous Impact of Inequality in Local Resource Management. *World Development*, Vol. 27, No. 5, pp. 773-788.

Bandyopadhyaya, S., M. Humavindu, P. Shyamsundar and L. Wang. 2004. Do Households Gain from Community based Natural Resources Management? An Evaluation of Community Conservancies in Namibia. World Bank Policy Research Working Paper 3337. Washington, D.C.: World Bank

<http://www.met.gov.na/publications/research/RDP68.pdf>

Community-based natural resource management is an important strategy to conserve and use sustainably biodiversity and wildlife in Namibia. In this paper, we seek to examine the extent to which conservancies have been successful in meeting their primary goal of improving the lives of rural households. We evaluate the benefits of community conservancies in Namibia by asking three questions: (a) Do conservancies significantly increase household welfare? (b) How does the change in a household's welfare resulting from the conservancy vary by household socio-economic characteristics? (c) Does participation in the conservancy increase household welfare relative to those who choose not to participate? The analysis is based on a socio-economic household survey conducted in 2002 across seven conservancies and 1,192 households. The results of the analysis suggest that community conservancies do have a positive impact on household welfare. We also conclude that this impact is poverty-neutral in some regions and pro-poor in others. The analysis supports the claim that the welfare benefits from conservancies may be more evenly distributed between participant and non-participant households than one might expect.

Beck, T. and C. Nesmith, 2001. Building on Poor People's Capacities: The case of common property resources in India and West Africa. *World Development*, Vol. 29, No. 1, pp. 119-133.

Becker, C.D., 2003. Grassroots to Grassroots: Why forest preservation was rapid at Loma Alta, Ecuador. *World Development*, Vol. 31, No. 1, pp. 163 – 176.

Bird, N. and C. Dickson, 2005. Poverty Reduction Strategy Papers: Making the case for forestry. ODI Forestry Briefing Number 7, Overseas Development Institute, London.

<http://www.odi.org.uk/fpeg/publications/policybriefs/forestrybriefings/7.html>

Poverty reduction strategies have become a major framework for national planning and international development assistance. However, forestry coverage is limited within most Poverty Reduction Strategy Papers. They find that without established ownership or precisely-defined rights over forest resources there is little incentive for poor people to invest in forest management. Poverty reduction strategies present a valuable opportunity to prioritise tenure reform in forested areas, although this is rarely acknowledged in existing PRSPs. Also, sector-led frameworks tend to be the most powerful lever of improved management practices within the bureaucratic structure of government. Poverty reduction strategies therefore need to strengthen links to sectoral planning processes. The national forest programme (nfp) represents the main planning framework for forestry in many countries. Nfps can provide the necessary broad platform to engage with the poverty reduction agenda by working towards coherent sector policies that have widespread support. Public consultations conducted as part of poverty reduction strategies may well understate the importance of forestry issues to the poor. Improved methodologies are required to compensate for the disincentives for the poor to reveal the extent of their dependence on resources which are often state assets to which they have no official right of access. They conclude that the contribution that forestry can make to poverty reduction has to be better understood and then communicated effectively in national policy circles. Sustainable forest management can probably play only a minor role in a growth-orientated, nationally accountable poverty reduction strategy. Yet through tenurial reform forests have the potential to provide significant, long lasting benefits for the rural poor.

Bishop, J. and P. Garzon. 2003. The Economic Value of Wild Resources in Senegal. Senegal: IUCN

http://www.biodiversityeconomics.org/applications/library_documents/lib_document.rm?document_id=955

The contribution of wild plants and animals to human welfare is widely appreciated but not routinely measured. This report presents a summary of findings of recent research on the value of non-timber forest products, game, and freshwater fisheries in Senegal, West Africa. The research is based on new data gathered from producers, traders, and consumers of wild plant and animal products. Annual value added from all non-timber wild plants, animals and

freshwater fisheries in Senegal – currently excluded from the national accounts – is thus conservatively estimated at no less than FCFA 14 billion and possibly as much as 25 billion (US\$ 19 to 35 million per annum). The results of the research demonstrate the economic significance of wild resources in Senegal. They also underscore the need to ensure the sustainable management of wild plants and animals for the benefit of those who depend upon them. As the government of Senegal pursues its long-term strategy for poverty reduction, it is essential that the full economic contribution of wild resources is taken into account.

Bojö, J. and R.C. Reddy, 2003. Poverty Reduction Strategies and the Millennium Development Goal on Environmental Sustainability: Opportunities for alignment. Environment Department Papers, Environmental Economics no. 92, World Bank

[http://inweb18.worldbank.org/ESSD/envext.nsf/44ByDocName/PovertyReductionStrategiesandtheMilleniumDevelopmentGoalonEnvironmentalSustainabilityOpportunitiesforAlignment/\\$FILE/PovertyReductionStrategiesandtheMilleniumDevelopmentGoalsonEnvironment.pdf](http://inweb18.worldbank.org/ESSD/envext.nsf/44ByDocName/PovertyReductionStrategiesandtheMilleniumDevelopmentGoalonEnvironmentalSustainabilityOpportunitiesforAlignment/$FILE/PovertyReductionStrategiesandtheMilleniumDevelopmentGoalsonEnvironment.pdf)

This assessment of 50 interim and full Poverty Reduction Strategy Papers (PRSPs) shows that a major effort is needed to raise the level of attention to MDG7 in the PRSPs. While progress has been registered with respect to integration of immediate environmental concerns, focus on long-term environmental sustainability is still lacking in most PRSPs. However, the revisions from interim to full PRSPs show promise. First, coverage of environmental issues has improved considerably from interim to full PRSPs. Second, our assessment shows that available data can be effectively utilized to enhance the alignment of PRSPs with MDG7, with particular attention to indicators that are directly linked to poverty. The strength of such links vary across countries, but are most apparent with respect to safe water, improved sanitation, substitution of traditional with modern fuels, and secure tenure for urban poor.

Bojö, J., J. Bucknall, K. Hamilton, N. Kishor, C. Kraus and P. Pillai, 2001. Environment. In PRSP Sourcebook. World Bank, Washington DC.

http://povlibrary.worldbank.org/files/4145_chap11.pdf

The many links between environmental management and poverty alleviation provide the rationale for systematic mainstreaming of environment in PRSPs and their associated processes. This chapter aims to help PRSP teams integrate environmental problems and opportunities in their work, and consider potential environmental and natural resources interventions in their poverty reduction strategies. The scope of environmental concerns is quite broad, and includes water supply and wastewater disposal, solid waste removal, indoor and urban air pollution, and natural resources issues such as land degradation, deforestation, loss of coastal ecosystems and fisheries. However, it is important that “environment” does not only bring restrictions and problems to mind. Better environmental management provides many opportunities to build sustainable livelihoods. Natural resources can be put to more productive use to alleviate income poverty. It also suggests that teams working at the country or sub-national level begin by a participatory analysis of the linkages between poverty and environment. Second, desirable but realistic targets need to be set with focus on the main priority problems. The next stage is to evaluate possible public actions for reaching those targets, on the basis of their expected cost effectiveness, institutional capacities, and lessons from past experience. Finally, a system for monitoring the outcomes of the interventions need to be put in place. The results are fed back into the next stage analysis, and so on.

Bojö, J., K. Green, S. Kishore, S. Pilapitya and R. Reddy, 2004. Environment in Poverty Reduction Strategies and Poverty Reduction Support Credits. Paper No 102, World Bank Environment Department, Washington DC.

<http://www->

[wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2004/12/16/000090341_20041216111209/Rendered/PDF/308900PAPER0EDP0102.pdf](http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2004/12/16/000090341_20041216111209/Rendered/PDF/308900PAPER0EDP0102.pdf)

More than 60 countries are in various stages of preparation and implementation of Poverty Reduction Strategies. This report examines the extent to which countries and the World Bank have integrated environmental considerations into such strategies and their associated documents. The results for the PRSPs show (a) considerable variation across countries; (b) an average level of mainstreaming that is low, and (c) a strong tendency for full PRSPs to better integrate environmental considerations than interim PRSPs. According to their findings, the Progress Reports also vary considerably in their degree of mainstreaming. Interestingly, there is only an insignificant positive correlation between the degree of mainstreaming in the PRSP itself and the mainstreaming in the Progress Report(s). With respect to the Joint Staff Assessments of PRSPs and PRSP Progress Reports, the review shows that the attention to

environmental aspects is highly variable. The focus is primarily on water and sanitation and disaster management. The JSAs that include more attention to the environment are mostly associated with PRSPs that are already relatively well mainstreamed, and vice-versa. The PRSC review shows significant variance across countries and a low average degree of mainstreaming. Some contextual factors that can explain that are discussed in the main text. It is too early to discuss any trend among PRSCs. In addition to the results, this report contains two case studies that go beyond the text analysis and review the implementation record in Sri Lanka and the additional environmental analysis done in Ghana that was based on the PRSP. The paper concludes by proposing a set of recommendations.

Boyd, C. and T. Slaymaker, 2000. Re-examining the “More People, Less Erosion” Hypothesis, Special case or wider trend? ODI Natural Resources Perspective No. 63. London: Overseas Development Institute

Brocklesby, M.A. and E. Hinshelwood, 2001. Poverty and the Environment: What the poor say. DFID. <http://www.dfid.gov.uk/Pubs/files/whatthepoorsay.pdf>

Participatory Poverty Assessments (PPA) seek to understand poverty from the standpoint of poor people themselves and include their voice in decision-making processes that affect them. This report presents the findings from a review of 23 PPAs covering 14 countries in Asia, Africa, Latin America and Europe. Poor people demonstrated that the environment was a crucial ‘card’ in the balance of livelihood management. Although just one element in a complex livelihood strategy, if environmental resources were threatened, damaged or withdrawn, it had substantial impact on poor people’s well-being. The way poor people were able to use, maintain and control their environmental resources and services influenced their well-being. The PPAs demonstrated that three main factors determined how well they could do this: local environment context, political and institutional context, and social differentiation. The report concludes with a series of recommendations for PPA design and implementation.

Brown, D, G. Shepherd, K. Schreckenber and A. Wells, 2002. Forestry as an Entry Point for Governance Reform. ODI Forestry Briefing No. 1, April 2002. Swansea: Centre for Development Studies

Burra, S., S. Patel and T. Kerr, 2005. Community-designed, Built and Managed Toilet Blocks in Indian Cities. In Bass S, H. Reid, D. Satterthwaite and P. Steele (eds.), 2005. Politics, Poverty and the Environment: Experiences from Asia, Africa, Latin America and the Caribbean. London: Earthscan Publications

DeRoy, A. and T. Shah, 2003. Socio-ecology of Groundwater Irrigation in India. In Llamas, R & E. Custodio (eds.). Intensive Use of Groundwater: Challenges and Opportunities. The Netherlands: Swets and Zetlinger Publishing Co.

DFID, DG for Development – European Commission, UNDP and the World Bank. 2002. Linking Poverty Reduction and Environmental Management. Washington, D.C.: World Bank

Can be downloaded from:

<http://web.worldbank.org/servlets/ECR?contentMDK=20393321&sitePK=407255>

Prepared as a contribution to the 2002 World Summit on Sustainable Development, the document focuses on ways to reduce poverty, and sustain growth. It defines the links between poverty, and the environment, and, demonstrates that sound, and equitable management of the environment is integral to achieving the Millennium Development Goals. Priorities for a sustained policy, and institutional change highlight governance improvement, enhanced assets of the poor, improved growth quality, and, reform international, and industrial country policies to address poverty, and environment concerns. To this end, the document emphasizes that policy opportunities exist, stipulating that poor people must be seen as part of the solution, rather than part of the problem; that environmental quality of growth matters to the poor; and, that environmental management cannot be treated separately from other development concerns.

DFID, 2004. Climate Change and Poverty: Making development resilient to climate change.

EC, DFID and IUCN, 2003. Biodiversity Brief 1: The links between biodiversity and poverty. Biodiversity in Development Project

http://www.uicn.org/themes/wcpa/pubs/pdfs/biodiversity/biodiv_brf_01.pdf

Poor people, especially those living in areas with low agricultural productivity, depend heavily and directly on genetic, species and ecosystem biodiversity to support their livelihoods. This support takes the shape of contributions to health and nutrition, reduced vulnerability, crop and stock development, and off-farm resource use. However, their livelihood needs are often subordinated to the interests of more powerful groups, so they receive fewer benefits from biodiversity, and bear most of the cost of development actions that reduce biodiversity. This brief outlines the value of biodiversity, opportunities for poverty reduction, links between local livelihoods and biodiversity, constraints to linking biodiversity and poverty reduction, and provides guidance for development agencies to play an active role in supporting ways of making biodiversity work for the poor.

Emerton L., F. Karanja and S. Gichere, 2001. Environment, Poverty & Economic Growth in Kenya: What are the links, and why do they matter? IUCN - The World Conservation Union, Eastern Africa Regional Office, Nairobi

http://www.xborderbiodiversity.org/dcforum/User_files/Policy_Brief_No_2_Kenya.pdf

Over the last decade the Kenyan economy has grown but when we look more closely at this encouraging economic picture, there are also however causes for serious concern. While Kenya's economy is undoubtedly growing, we can at the same time see signs of environmental degradation and pollution. This paper argues that environmental depletion and degradation are not just environmental issues, they are also economic issues. Environmental degradation is largely caused by economic activities, it also gives rise to economic costs which may prejudice future growth, income and equity in Kenya, and lead to a significant worsening in the incidence of poverty. There is a dearth of information about either the real economic value of Kenya's environmental resources or about the costs associated with environmental degradation and loss. Little too is known about the types of economic policy instruments that can be used to enhance the management of these scarce resources. Although the ecological aspect is relatively well understood, we are far from an understanding of the economic causes and implications of environmental loss, or from reflecting it in our programmes and projects including development plans, policies, and strategies. It is essential to emphasise the role of the environment in Kenya's Poverty reduction strategies and development plans - not only in attempting to alleviate poverty, but also in stimulating economic growth.

Emerton, L., R. Seilava and H. Pearith. 2002. Bokor, Kirirom, Kep and Ream National Parks, Cambodia. Case Studies of Economic and Development Linkages. Karachi: IUCN

European Forest Institute (EFI). 2003. Forests in Poverty Reduction Strategies: Capturing the potential. Tuusula 2002 findings - reducing poverty with forestry. Summary of findings of workshop on Forests in Poverty Reduction Strategies: Capturing the Potential, Tuusula, Finland. Ministry for Foreign Affairs of Finland, the European Forest Institute (EFI) and the Viikki Tropical Resource Institute (VITRI) of the University of Helsinki, Finland.

Can be downloaded from

http://www.efi.fi/attachment/f5d80ba3c1b89242106f2f97ae8e3894/8a7cf6f0874e44377cf93874accdb8bc/poverty_reduction.pdf

This short publication outlines how forestry is a productive sector with significant effects on poverty reduction. Forests and trees are a source for rural income and employment, they provide for subsistence needs and reduce vulnerability. A wide variety of commercial products also originate from forests generating tax revenue, government levy and export earnings. Forest sector generates rural income and employment. Forest products are important sources of cash income and employment for the rural poor. They produce and market a great number of wood and non-wood forest products. Many of these products require little investment, are labour intensive and can be sold both locally and internationally. Rural forest enterprises span from family business to large international forest companies. Forests and trees provide for subsistence needs and reduce vulnerability. Forest and trees are essential for agriculture, they maintain water supply, provide soil nutrients and animal fodder and protect soils against erosion. The poorest households, women and children depend most on forest products, obtaining often a major share of their subsistence from products derived from forest fruits and animals. These products are especially important in times of famine and crisis when nothing else is available. The vast majority of the rural poor depend on fuelwood for cooking and heating. Forestry can reduce poverty.

Ferroukhi, L. (ed.), 2003. Municipal Forest Management in Latin America. Bogor, Indonesia: CIFOR, IDRC

Gunatilake, H.M. and L.H.P. Guneratne, 2002. Policy Options for Conserving Sri Lanka's Natural Forests. Singapore: Research Report, Environment and Economics Program for Southeast Asia (EEPSEA)

Haley, S. 2004. Institutional Assets for Negotiating the Terms of Development: Indigenous collective action and oil in Ecuador and Alaska. Anchorage: Institute of Social and Economic Research. Economic Development and Cultural Change, Vol. 35, No 1

http://www.iser.uaa.alaska.edu/iser/people/Sharman/Ecuador_AK%20Oil.pdf

This article compares two seemingly similar ARCO oilfield developments. Both developed in the mid-1990s in remote, environmentally sensitive regions, with innovative roadless designs and extensive involvement with local indigenous populations. However, they have very different economic outcomes for the communities. This article explores major factors underlying the differences.

Henninger, N. and A. Hammond. 2002. Environmental Indicators Relevant to Poverty Reduction. Environment Department Strategy Series No 3. Washington, D.C.; World Bank.

Iftikhar, U. and L. Emerton, 2002. Why Pakistan Can't Afford Not to Invest in Sustainable Development. IUCN – The World Conservation Union, Pakistan Environmental Economics Programme, Karachi

We seem to be engaged in a constant (and often seemingly fruitless) struggle to attract funds to implement sustainable development policies, strategies and plans. But, without making a convincing argument as to why a healthy environmental resource base is necessary in financial and economic terms, these calls for funding are likely to remain unheard. In fact, investing in sustainable development makes good financial and economic sense for both governments and businesses. In Pakistan, environment and natural resources account for around 45% of national income, 60% of employment, and 75% of foreign exchange earnings. And this economic and financial contribution is only the tip of the iceberg. Taking into account important, but often unseen, ecological services and environmental functions, would raise this figure substantially. The costs of remediation of environmental neglect in Pakistan are estimated at more than \$1 billion, or .6% of GDP. Clearly, the environment plays a crucial role in Pakistan's development, and certainly merits investment. The key questions are however to demonstrate the total economic value of the environment so that we can justify investment in sustainable development, and how to set in place the kinds of economic and financial instruments that will capture these values and raise adequate funds to implement sustainable development policies, strategies and plans. This requires moving far beyond the boundaries of conventional economic and accounting procedures.

IFRC-RCS, 2002. World Disasters Report: Focus on reducing risk. International Federation of Red Cross and Red Crescent Societies

Ireland, C. and G. Tumusahabe, 2004. The Evolving Roles of Environmental Management Institutions. In Bass, S., H. Reid, D. Satterthwaite and P. Steele (eds.), 2005. Reducing Poverty and Sustaining the Environment: The politics of local engagement. London: Earthscan

International Institute for Environment and Development (IIED), in association with: Council for Social Development (India), Institute of Resource Assessment (Tanzania), Kechua-Aymara Association for Sustainable Livelihoods (Peru), UNDP Equator Initiative and SwedBio, 2004, Policy that Works for Biodiversity and Poverty Reduction. Paper prepared by IIED for CBD COP7, February 2004

The first section of the paper reviews some of the policy and institutional challenges that need to be addressed in order to 'scale-up' community conservation initiatives. Although it draws largely on experience in community-based wildlife and forest management, the project also focuses on community biodiversity management in agricultural landscapes.

IUCN. 2004. Mapping Poverty and Conservation Linkages: Using Decision-Support-System Tools to Help Implement the MDGs. Workshop during 3rd World Conservation Congress, Bangkok. CD-ROM. Gland: IUCN

Jansen, K. and E. Roquas, 1998. Modernising Insecurity: The land titling project in Honduras. *Development and Change*, Vol 29, no 1, Jan 1998

Jodha, N.S., 1990. Rural Common Property Resources: Contributions and crisis. *Economic and Political Weekly*, June 30, A65-A78

Johnson, C., 2004. Uncommon Ground: The "poverty of history" in common property discourse. *Development and Change*, Vol. 35, No. 3, pp. 407-33

Kiss, A., 2003. Africa – Environmental Strategies. Environment Matters. Annual Review 2002-2003: 36-39, World Bank, Washington DC

http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2003/11/07/000012009_20031107140207/Rendered/PDF/271010paper.pdf

According to the World Bank, poverty alleviation continues to be their core mission and a central concern of their clients. Clarifying and addressing environment/poverty linkages is a top priority. New instruments—such as Poverty Reduction Strategy Papers (PRSPs) and Poverty Reduction Strategy Credits (PRSCs)—are increasingly setting the development agenda and serving as a main channel for World Bank assistance. Mainstreaming environment in this context begins with improving poverty assessment, analysis, and monitoring. To promote mainstreaming of poverty/ environment issues, the World Bank Africa Region has launched a program to develop and promote among clients and Bank teams the use of appropriate environmental outcome indicators and tools for monitoring the contribution of PRSPs, country assistance strategies, and policy/ program-based lending operations to improving environmental management and in-country capacity. This paper describes environment-poverty issues, and how they are being addressed by the program, in water resource management, sustainable livelihoods and conflict management on fragile lands, capacity building for environmental management, community-based natural resource management, and protected areas.

Klop, P. and P. Steele, 2006. Pro-poor Growth or Boom and Bust? The politics of natural resources. Revised draft

Leach, M. and R. Mearns, 1996. *The Lie of the Land: Challenging received wisdom on the African Environment*. Oxford: James Currey Publishers

Lele, S., 2000. *Godsend, Sleight of Hand or Just Muddling Through: Joint water and forest management in India*. ODI Natural Resource Perspectives No. 53. London: Overseas Development Institute

Mukherjee, N., J. Hardjono and E. Carriere, 2002. *People, Poverty and Livelihoods: Links for sustainable poverty reduction in Indonesia*. Jakarta, Indonesia: World Bank and Department for International Development.

Can be ordered from <http://www.worldbank.or.id/>

In 2000 the World Bank and DFID discussed how the World Bank strategic report on poverty in Indonesia (*Indonesia: Constructing a New Strategy for Poverty Reduction*) could reflect the voices and realities of poor people themselves. It was agreed that DFID and the World Bank would organise a limited number of participatory poverty assessments to provide qualitative depth to issues discussed in the World Bank report. The authors of this book tested the DFID's Sustainable Livelihoods framework to carry out participatory action research in urban and rural locations in four provinces of Indonesia. The book documents the process, the findings and their implications, and offers some reflection on the methodology used.

Narayan, D., 2002. *Voices of the Poor: From many lands*. World Bank Publication

Can be downloaded from:

http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&eid=000094946_02021604090737

This is the final book in a three-part series entitled, "Voices of the Poor." The series is based on an unprecedented effort to gather the views, experiences, and aspirations of more than 60,000 poor men and women from sixty countries. The work was undertaken for the "World Development Report 2000/2001: Attacking Poverty." This publication is organized as follows: Each country chapter opens up with a brief life story. These life stories were chosen because they highlight concerns raised not only by poor women and men living in that particular

community, but because the same concerns were echoed in other parts of the country. The chapters then unfold around particular sets of issues that emerged repeatedly in group discussions and individual interviews. While the findings reported in the chapters cannot be generalized to represent poverty conditions for an entire nation, the chapters bring to life what it means to be poor in various communities, in fourteen countries, from the perspective of poor people. In the final chapter, four major patterns emerge: Poor people need a diverse set of assets and capabilities if they are to survive and overcome poverty. Economy-wide policies and shocks deplete poor people's assets and increase their insecurity. The culture of mediating institutions often negatively distorts the impact of well-intended policies and excludes the poor from gains. Gender inequity within households is persistent and children are acutely vulnerable.

Neumayer E., 2004. Does the Resource Curse Hold for Growth in Genuine Income As Well? *World Development*, Vol 32, No 10, October 2004

Norton A. and M. Foster, 2001. The Potential of Using Sustainable Livelihoods Approaches in Poverty Reduction Strategy Papers. Working Paper 148, Centre for Aid and Public Expenditure, Overseas Development Institute (ODI), London
<http://www.odi.org.uk/publications/wp148.pdf>

This paper addresses the question of whether sustainable livelihood approaches have value at the level of overall policy on poverty reduction, and specifically addresses to what extent the approach might be used in support of poverty reduction strategy papers. The strengths of the approach are that it aims to reflect the complex range of assets and activities on which people depend for their livelihoods, and recognises the importance to poor people of assets which they do not own. It provides a framework for addressing the whole range of policy issues relevant to the poor, not just access to health and education, but issues of access to finance, markets, and personal security. It emphasises sustainability, and the need for a people centred and participatory approach, responsive to changing circumstances, and capable of working at multiple levels from national to local, in partnership with public and private sector. The paper also considers which specific policy issues addressed by a typical PRSP process might especially benefit from a SL framework. It identifies opportunities to extend analysis in this direction at every level from macro policy through taxation, expenditure, and regulatory changes.

Nunan, F., U. Grant, G. Bahiigwa, T. Muramira, P. Bajracharya, D. Pritchard and M. Vargas, 2002. Poverty and the Environment: Measuring the Links: A study of poverty-environment indicators with case studies from Nepal, Nicaragua and Uganda. Issue Paper No. 2, UK Department for International Development (DFID) Environment Policy Department, London.
<http://www.dfid.gov.uk/pubs/files/povertyandtheenvironment.pdf>

There have been numerous initiatives to develop indicators that track trends and developments in the state of the environment, and indicators that reflect on human development, particularly comparing trends between countries as well as over time. But human development and environmental issues have generally been looked at separately, and there is a need to develop indicators that reflect the relationships between them, particularly focusing on poverty and environment. Many PRSPs produced to date have not sufficiently considered environmental issues or recognised the linkages between poverty and the environment. Subsequently, associated poverty-environment indicators have not been generated. This report sets out the key findings of a study conducted between September 2000 and April 2001 to develop and pilot test a set of generic poverty-environment indicators for potential use in PRSPs. The indicators were developed through a review of environmental issues of relevance to the poor, particularly drawing on findings from participatory poverty assessments. The draft indicators were then pilot tested in Uganda, Nepal and Nicaragua. The development and use of poverty-environment indicators is likely to continue with further developments in PRSPs. This study provides one approach and set of indicators, with country-specific examples.

OECD. 2004. *Handbook of Market Creation for Biodiversity*. Paris: OECD

OECD, 2005. Environmental Fiscal Reform for Poverty Reduction. DAC Guidelines and Reference Series, OECD Publishing
<http://www.oecd.org/dataoecd/14/25/34996292.pdf>

This document explains Environmental Fiscal Reform and how it can contribute to poverty reduction, namely through revenue mobilisation, reduced distortions and reduced drains on public finances. It also suggests suitable measures for developing countries.

Ostrom, E., 1996. Crossing the Great Divide: Co-production, synergy and development. World Development, Vol. 24, No. 6, pp. 1073-1087

Pagiola, S., 2001. Deforestation and Land Use Changes Induced by the East Asian Economic Crisis. East Asia Environment and Social Development Unit, Discussion paper, World Bank

Paris, R. 2001. Poverty-environment gender linkages. Development Assistance Committee Journal. 2 (4): 3-91

Poole, N.D., 2004. Perennialism and Poverty Reduction. Development Policy Review, Vol. 22, No. 1, pp. 49-74. London: Overseas Development Institute

Reed, D., 2004. Analyzing the Political Economy of Poverty and Ecological Disruption. Economic Change for Poverty and the Environment, Macroeconomics Program Office, Worldwide Fund for Nature, Washington DC.

http://assets.panda.org/downloads/analyticalapproach_cufa.pdf

This paper presents an analytical approach that is intended for use by community groups, civil society organizations, development agencies, and governmental offices that are seeking to change, in fundamental ways, the dynamics of poverty and environmental degradation in rural areas of the developing world. This approach is designed to identify the principal constraints to rural poverty reduction and improved natural resource management. It is also designed to facilitate development of strategic interventions to address those constraints at local, regional, and national levels. In conclusion the paper underscores that there is, invariably, a political dimension to both this analytical approach and to the interventions that flow from it. The approach is political in the sense that it seeks changes, however modest, in the distribution of power and opportunity in specific contexts and societies to favour the rural poor and those who manage environmental resources in rural areas. It follows that there also is an explicit and deliberate effort to diminish the influence of those groups dominating the rural poor and exploiting natural resource wealth in rural areas. The five experiences on which this analytical approach is constructed affirm that only by changing the equation of power in rural areas can the poor raise their living standards and improve their management of the surrounding environment.

Reed, D., 2004. Poverty is Not a Number, the Environment is Not a Butterfly. Viewpoint Series on Poverty and the Environment, Macroeconomics Program Office, Worldwide Fund for Nature, Washington DC

<http://www.panda.org/downloads/policy/butterfly.pdf>

This paper argues that in the years since UNCED, very little attention has been given to the intimate relationship between rural poverty and the environment, and even less has been done to change policy and institutions to address these two inextricably linked dimensions of development. It offers a different perspective on the current treatment of rural poverty and the environment, highlighting why an enduring integration of poverty and the environment has proven difficult in practice. Above all it highlights the trade-offs that must be made between prevailing approaches to poverty alleviations and proposes specific policy guidelines that will allow the international community to take substantive steps towards integrating poverty alleviation and environmental sustainability in rural areas.

Ribot, J.C., 1998. Theorising Access: Forest profits along Senegal's charcoal commodity chain. Development and Change, Vol. 29, No. 2, April 1998

Ribot, J.C., 2002. Democratic Decentralization of Natural Resources: Institutionalizing popular participation. Washington DC: World Resources Institute

Scherr, S., A. White and D. Kaimowitz, 2004. A New Agenda for Forest Conservation and Poverty Reduction: Making markets work for low income producers. Washington DC: Forest Trends, CIFOR and IUCN

http://www.cifor.cgiar.org/publications/pdf_files/Books/A%20New%20Agenda.pdf

This paper lays out a set of strategies to promote forest conservation in ways that positively contribute to local livelihoods and community development in low- and middle-income

countries. The authors fully recognize the critical importance of the “safety net” functions of forests for the poor. But they also identify specific market niches where large numbers of low-income producers have, or could develop, a competitive market advantage. Critical to achieving these benefits will be removing present policy barriers to local market participation, in particular securing forest use and ownership rights, reducing excessive regulatory burdens, “levelling the playing field” for local producers in forest markets, and involving local producers in forest policy negotiations. The authors identify key roles in the strategy for local people’s organizations and federations, for private forest industries and investors, for rural development and conservation institutions, and for policymakers.

Shyamsundar, P., 2002. Poverty-Environment Indicators. Environment Department Paper 84. Washington D.C.: World Bank

Smith W., 2003. Combating Illegal Logging: A review of initiatives and monitoring tools. Washington DC: World Resources Institute

Tang, S., C. Tang and C. Lo, 2005. Public Participation and Environmental Impact Assessment in Mainland China and Taiwan: Political foundations of environmental management. *The Journal of Development Studies*, Vol. 41, No 1, pp. 1-32

Can be purchased from <http://taylorandfrancis.metapress.com/>

What role can public participation play in environmental management? Among major tools for environmental management, Environmental Impact Assessment (EIA) has been widely practised in many countries. Its effectiveness, however, varies depending on the extent to which transparency and public participation are incorporated in its process. In this article, we analyse the role of public participation in environmental management by examining the operation of EIAs in two polities, Mainland China and Taiwan. In both cases, a lack of transparency and public participation had severely limited the effectiveness of EIA during the initial years when it was first introduced. Both polities have attempted to address the respective limitations of their EIA systems, and both have made some progress while encountering problems inherent in their underlying political institutions. The two cases illustrate the dynamic connections between political institutions and environmental management in developing countries.

Thapa, K.K., R.E. Bilborrow and L. Murphy, 1996. Deforestation, Land Use and Women’s Agricultural Activities in the Ecuadorian Amazon. *World Development*, Vol. 24, No 8, pp. 1317-1332

UNDP, 2002. Localizing MDGs for Poverty Reduction in Viet Nam: Ensuring environmental sustainability. UNDP Viet Nam

UNDP, UNEP, World Bank and WRI, 2003. *World Resources 2002-2004: Decisions for the Earth: Balance, voice, and power*. Washington DC: World Resources Institute

UNEP, 2005. Mainstreaming Environment Beyond MDG 7. Discussion Paper for the High-Level Workshop, 13-14 July 2005, Nairobi

Can be downloaded from http://www.unep.org/dec/support/mdg_meeting.html

This discussion paper outlines the linkages that exist between MDGs and MEAs from a substantive point of view. Although not completely exhaustive, it does try to flesh out critical linkages and at the same time highlight practical examples of these linkages. What this paper does not do is to explore institutional linkages that exist and the practical aspects of implementation necessary to convert these links into synergies on the ground for countries.

Whittington, D., X. Mu and R. Roche, 1990. Calculating the Value of Time Spent Collecting Water: Some estimates for Ukunda, Kenya. *World Development*, Vol. 18, No. 2, pp. 269-280

World Bank. 2000. *Environment and Natural Resources Sourcebook*. Washington, D.C.: The World Bank

World Bank, 2001. *Making Sustainable Commitments: An environment strategy for the World Bank*. World Bank

2.3 Millennium development goals (MDGs), sustainable development and the environment

Antle, J. and G. Heidebrink. 1995. Environment and development: theory and international evidence, *Economic Development and Cultural Change*, 43, 603-625

Atkinson, G., Dubourg, R., Hamilton, K., Munasinghe, M., Pearce, D.W and Young, C. 1997. *Measuring Sustainable Development: Macroeconomics and the Environment*. Cheltenham: Edward Elgar

Auty, R. M., 2003. Natural Resources, Development Models and Sustainable Development. Environmental Economics Programme Discussion Paper 03-01. London: International Institute for Environment and Development

http://www.poptel.org.uk/iied/docs/eep/dp03_01.pdf

This paper starts out from the optimistic assumption that the basic policies for environmental economic development are known but uncertainties surround the speed of their adoption. In many developing countries the key obstacle is poor governance: consequently, renewable resources continue to be mined, non-renewable resources are depleted irresponsibly, and reductions in pollution intensity lag. Recent research identifies resource abundance as an important cause of policy failure. Sound macroeconomic policy is critical to the success of microeconomic measures like much of environmental policy, a fact often neglected by environmental reformers.

Carney, D. 2002. *Sustainable Livelihood Approaches: Progress and Possibilities for Change*. London: DfID

Greenspan Bell, R. and Russell, C. 2002. Environmental policy for developing countries. *Issues in Science and Technology*. Spring. 63-70

Greenspan Bell, R. and Russell, C. 2003. Ill-considered experiments: the environmental consensus and the developing world. *Harvard International Review*, Winter. 20-25

Can be purchased from <http://www.questia.com/PM.qst?a=o&se=gglsc&d=5000643548>

For a brief period between the end of the Cold War and September 11, 2001, an opportunity arose to consider global concerns beyond East-West politics and nuclear threats. The connection between states' failed environmental policies and the devastation wreaked on the health and stability of their people suddenly became a frequently discussed subject in foreign policy, no longer consigned to specialized journals. However, though the foreign policy debate has shifted, the potentially disruptive environmental conditions still persist. One solution to pollution and depleted biodiversity has come in the form of development assistance. International financial institutions' (IFI) environmental advice to the developing world and transitioning countries sounds familiar. Its components--principally market solutions--parallel what the institutions and their advisors (dubbed the Washington Consensus) tell the same countries to do to reform their economies.

Kelley, A. 1998. *The Impacts of Rapid Population Growth on Poverty, Food Provision, and the Environment*. Duke University. Mimeo

Lomborg, B. 2004. *Global Crises, Global Solutions*. Cambridge: Cambridge University Press

Can be purchased from <http://www.cambridge.org/uk/catalogue/catalogue.asp?isbn=0521606144>

This publication explores the opportunities for addressing ten of the most serious challenges facing the world today: Climate Change, Communicable Diseases, Conflicts, Education, Financial Instability, Corruption, Migration, Malnutrition and Hunger, Trade Barriers, Access to Water. In a world fraught with problems and challenges, we need to gauge how to achieve the greatest good with our money. *Global Crises, Global Solutions* provides a rich set of arguments and data for prioritising our response most effectively. Each problem is introduced by a world-renowned expert defining the scale of the problem and describing the costs and benefits of a range of policy options to improve the situation. Each challenge is evaluated by economists from North America, Europe and China who attempt a ranking of the most promising options. Whether you agree or disagree with the analysis or conclusions, *Global Crises, Global Solutions* provides a serious, yet accessible, springboard for debate and discussion.

Martin-Hurtado, R. 2002. Costing the 7th Millennium Development Goal: Ensuring Environmental Sustainability. Environment Department, The World Bank (mimeo).

Panayotou, T. 1998. Instruments of Change: Motivating and Financing Sustainable Development. London: Earthscan.

UN Development Programme. 2003. Human Development Report 2003: Millennium Development Goals – A Compact Among Nations to End Human Poverty. Oxford: Oxford University Press

Can be downloaded from <http://hdr.undp.org/reports/global/2003/>

Addressing poverty requires understanding its causes. This Report adds to that understanding by analysing the root causes of failed development, including three previous constraints. The first was the need for economic reforms to establish macroeconomic stability. The second was the need for strong institutions and governance— to enforce the rule of law and control corruption. The third was the need for social justice and involving people in decisions that affect them and their communities and countries—an issue that this Report continues to champion. These issues are all crucial for sustainable human development, and they continue to deserve priority attention in policy-making. But they overlook a fourth factor, explored here: the structural constraints that impede economic growth and human development. The report also explores top priority actions by rich countries.

UN Millennium Ecosystem Assessment. 2005. Millennium Ecosystem Assessment – Synthesis Report. Washington, D.C.: World Resources Institute

Can be purchased from <http://www.islandpress.org/books/detail.html/SKU/1-59726-040-1>

This report presents a synthesis and integration of the findings of the four MA Working Groups on the Earth's ecological health and its linkages to human well-being along with more detailed findings for selected ecosystem services concerning condition and trends and scenarios, and response options. The volume then presents a snapshot of the health and prospects for each of the main services that ecosystems provide, including the provision of food, water, timber, fuel, climate regulation, disease prevention, and others.

UN Millennium Project. 2005a. Investing in Development: a Practical Plan to Achieve the Millennium Development Goals. Overview. New York: United Nations

UNDP. 2004. Human Development Report 2004: Cultural Liberty in Today's Diverse World. Oxford: Oxford University Press

United Nations. 2005a. In Larger Freedom: Towards Development, Security and Human Rights for All. Document A/59/2005. New York: United Nations

World Bank. 2002a. The Environment and the Millennium Development Goals. Washington, D.C.: World Bank.

2.4 Health and education (and links to other MDGs)

ADB, WHO and UNEP, 2004. Water, Poverty, Health and Environment in ASEAN and East Asian Countries. Paper presented at WHO, UNEP and ADB high level meeting on Health and Environment in ASEAN and East Asian countries. Manila, Philippines: 24-26 November 2004.

Bhargava, A., Jamieson, D., Lau, L and Murray, C. 2001. Modelling the effects of health on economic growth. *Journal of Health Economics*. 20: 423-440

Bruce, N., R. Perez-Padilla and R. Albalak, 2000. Indoor Air Pollution in Developing Countries: A major environment and public health challenge. *Bulletin of the World Health Organization*, 78 (9), pp. 1078-1092.

Cairncross, S., D. O'Neill, A. McCoy and D. Sethi, 2003. Health, Environment and the Burden of Disease: A guidance note. UK: Department for International Development (DFID).

<http://www.dfid.gov.uk/pubs/files/healthenvirondiseaseguidenote.pdf>

Good health is both an end and a means of sustainable livelihood. For poor households, health is an essential asset in the pursuit of their livelihood, but their home and work environment often threatens their health. Improving environmental conditions which affect health is therefore basic to the creation of sustainable livelihoods and the elimination of

poverty. This Guidance Note examines the conditions which determine whether an environmental hazard is responsible for a substantial amount of disease, and whether feasible measures are available to prevent it. It considers three problems which account for nearly three quarters of the environmental burden of disease: water, sanitation and hygiene; indoor air pollution; and injuries. The final part of this Guidance Note considers how DFID and its partners can act to improve the health of the poor through improving environmental conditions.

Chivian, E. (ed.), 2003. Biodiversity: Its importance to human health. Interim Executive Summary. A Project of the Center for Health and the Global Environment, Harvard Medical School.

http://chge.med.harvard.edu/publications/documents/Biodiversity_v2_screen.pdf

The aim of this project is to provide a comprehensive assessment of how biodiversity interacts with and contributes to human health and makes life on Earth possible. There is growing concern about the health consequences of biodiversity loss and change. An important consequence for humans is the disruption of ecosystems that provide nature's goods and services. Biodiversity loss also means that we are losing, before discovery, many of nature's chemicals and genes, of the kind that have already provided humankind with enormous health benefits. There are also well-founded concerns about the need to understand and assess the impacts of modern food biotechnology on human health.

ERM-DFID. 2005. Meeting The Water and Sanitation Millennium Development Goal. Final Report, Reference 0026288. Environmental Resources Management: London.

Gangadharan, L. and R. Valenzuela. 2001. Interrelationships between income, health and the environment: extending the environmental Kuznets curve hypothesis. *Ecological Economics*. 36: 513-31

http://www.economics.unimelb.edu.au/research/workingpapers/wp00_01/740.pdf

This study examines the link between the health indicators and the environmental variables for a cross-section of countries widely dispersed in the economic development spectrum. While the environment and income are seen to have an inverted U-shaped relationship (Environmental Kuznets Curve hypothesis), it is also well established that health and environment are positively related. Our study focuses on the implications of this for the relationship between health and income. In the early phases of income growth, the gains in health and the losses in environmental quality could cancel each other out and this challenges the idea that as incomes increase health would always improve. To empirically analyse these issues, we estimate a two-stage least squares model that focuses on the impact of income and the environment on health status, with environment being an endogenous variable. Our results show that the environmental stress variable has a significant negative effect on health status. At the same time, GNP levels and improvements in access to better sanitation and safe water are shown to vary positively with health status variables. We find that the health gains obtained through improved incomes can be negated to a significant extent if the indirect effect of income acting via the environment is ignored. Research findings in this regard would be a useful policy instrument towards maximising both the environmental and health gains that come with economic growth and development.

Hutton, G and L. Haller. 2004. Evaluation of the Costs and Benefits of Water and Sanitation Improvements at the Global Level. WHO/SDE/WSH/o4. 04. Geneva: World Health Organisation.

https://www.who.int/water_sanitation_health/wsh0404.pdf

The aim of this study was to estimate the economic costs and benefits of a range of selected interventions to improve water and sanitation services, with results presented for 17 WHO sub-regions and at the global level. The results show that all water and sanitation improvements were found to be cost-beneficial. The main contributor to benefits was the saving of time associated with better access to water supply and sanitation services. When different cost and benefit assumptions were used, the cost-benefit ratios changed considerably, but even under pessimistic scenarios the potential economic benefits generally outweighed the costs.

Lopez, R. and A. Valdes. 2000. Fighting rural poverty in Latin America: New evidence and the effects of education, demographics, and access to land. *Economic Development and Cultural Change*. 49(1): 197-211

Can be purchased from www.jstor.org

This article synthesizes six case studies of rural poverty in Latin America – Chile, Columbia, El Salvador, Honduras, Paraguay and Peru - and several thematic studies that examine land,

labour and poverty, using both rural household survey data and quantitative analyses of farm production function and household incomes.

Lvovsky, K. 2001. Health and Environment. Environment Strategy Papers, Strategy Series No. 1. World Bank Environment Department. Washington, D.C.: World Bank.

McCauley, D. and P. Steele, 2004. Poverty, Health and Conservation: Healthy ecosystems, healthy people. Paper presented at WHO, UNEP and ADB high level meeting on Health and Environment in ASEAN and East Asian countries. Manila, Philippines: 24-26 November 2004.

This paper presents insights from 14 ADB and IUCN-sponsored projects, identifying the synergies between poverty, health and conservation in South and Southeast Asia, particularly: the correlation between healthy ecosystems and healthy people; good governance; and approaches for poverty reduction in resource-scarce and resource-abundant communities.

Murray, C. and Lopez, R (eds), 1996. The Global Burden of Disease, Harvard University Press, Cambridge, Mass
Myers, N. and Kent, J. 1998. Perverse Subsidies: Tax Dollars Undercutting our Economies and Environments Alike. Winnipeg: International Institute for Sustainable Development

UNEP and WHO, 2004. Health & Environment: Tools for Effective Decision-Making. The WHO-UNEP Health and Environment Linkages Initiative (HELI) - Review of Initial Findings. Geneva: UNEP/GRID Arendal.

Can be downloaded from <http://www.who.int/heli/publications/brochure/en/index.html>

This publication addresses critical development/policy issues from an environment and health perspective; develops a holistic package of recommendations; and recommends action for implementation. UNEP's and WHO's intersectoral approach can optimize the use of economic tools to quantify the health and environmental impacts of alternative choices and, where relevant, translate these impacts into the monetary terms upon which decision-makers often base their judgements. Using the tools of economic valuation to address health and environmental problems creates other synergies. It contributes to a greater appreciation of the goods and services provided by natural ecosystems. It can help decision-makers to identify mutually beneficial strategies that simultaneously promote human well-being and environmental protection and development, as well as poverty reduction.

UN-Habitat, 2003. Guide to Monitoring Target 11: Improving the lives of 100 million slum dwellers. Nairobi: May 2003.

WHO and UNICEF, 2004. Meeting the MDG Drinking Water and Sanitation target: A mid term assessment of progress. Joint Monitoring Programme for Water Supply and Sanitation.

2.5 Income, growth and poverty

Attanasio, O. and M. Szekeley (eds.) 2001a. Portrait of the Poor: An Assets-Based Approach. Baltimore: Johns Hopkins University Press for Inter-American Development Bank

Attanasio, O. and M. Szekeley. 2001b. Going beyond income: Redefining poverty in Latin America. In Attanasio and Szekeley (2001a). 1-43

Barbier. E. 2005. Frontier expansion and economic development. Contemporary Economic Policy, in press.

Can be purchased from <http://cep.oupjournals.org/>

Although finding "new frontiers", or "reserves", of natural resources to exploit has been the basis of much of global economic development for the past five hundred years, frontier-based development does not appear to be producing sustained, high rates of growth in today's poorer economies. Through a two-sector model of frontier expansion and economic growth in a resource-dependent small open economy, this paper demonstrates that such expansion will lead inevitably to a boom and bust pattern of long-run development, even if the economy's terms of trade or commodity prices remain unchanged. Initially, it is always optimal for the economy to choose the maximum rate of frontier expansion, and thus ensure an immediate economic boom. However, an eventual economic decline is unavoidable. This result provides an alternative explanation of recent empirical evidence that resource-abundant developing countries display lower than expected long-run rates of growth.

Beckerman, W. 1992. Economic growth and the environment. Whose growth? Whose environment? World Development. 20: 481-496

Beugelsdijk, S., H. de Groot and A. van Schaik. 2002. Trust and Economic Growth: a Robustness Analysis. Tinbergen Institute Discussion Paper TI 2002-049/3. Tilburg: Tilburg University

Birdsall, N. and J. Londoño. 1998. Asset inequality matters: An assessment of the World Bank's approach to poverty alleviation. American Economic Review. 87 (2): 32-37

Bucknall, J., C. Kraus and R. Pillai. 2000. Poverty and Environment. Environment Strategy Papers. Washington, D.C.: World Bank

Chen, S. and M. Ravallion. 2004. How Have the World's Poor Fared Since the Early 1980s? World Bank Policy Research Working Paper 3341. Washington, D.C.: World Bank

http://www.worldbank.org/research/povmonitor/MartinPapers/How_have_the_poorest_fared_since_the_early_1980s.pdf

An assessment is made of the developing world's progress against poverty. By the frugal \$1 a day standard there were 1.1 billion poor people in 2001 - almost 400 million fewer than 20 years earlier. During that period the number of poor people declined by more than 400 million in China, though half the decline was in the early 1980s and the number outside China rose slightly. At the same time the number of people in the world living on less than \$2 a day rose, so that there has been a marked bunching up of people living between \$1 and \$2 a day. Sub-Saharan Africa has become the region with the highest incidence of extreme poverty and the greatest depth of poverty. If these trends continue, the 1990 aggregate \$1 a day poverty rate will be halved by 2015, meeting the Millennium Development Goal, though only East and South Asia will reach this goal.

Dasgupta, P. 1992. Population, resources and poverty, Ambio, 21, 95-101

Dasgupta, P. 1993. An Inquiry into Well-being and Destitution, Clarendon Press: Oxford

Deininger, K. and P. Olinto. 2000. Asset Distribution, Inequality, and Growth. Policy Research Working Paper 2375. Washington, D.C.: World Bank

Dercon, S. 2005. Vulnerability: a Micro Perspective. Oxford: Oxford University. Mimeo.

<http://www.econ.ox.ac.uk/members/stefan.dercon/vulnerability.pdf>

High downside risk to income and livelihoods is part of life in developing countries. Climatic risks, economic fluctuations, and a large number of individual-specific shocks leave these households vulnerable to severe hardship. The paper explores the links between risk, vulnerability and poverty, taking a micro-level perspective. Risk does not just result in variability in living standards. There is increasing evidence that the lack of means to cope with risk and vulnerability is in itself a cause of persistent poverty and poverty traps. Risk results in strategies that avoid taking advantage of profitable but risky opportunities. Shocks destroy human, physical and social capital limiting opportunities further. The result is that risk is an important constraint on broad-based growth in living standards in many developing countries. It is a relatively ignored part when designing anti-poverty policies and efforts to attain the Millennium Development Goals. The paper discusses conceptual issues, the evidence and the policy implications.

Ferreira, S. and J.R.Vincent 2003. Why Genuine Savings? Mimeo. San Diego: Department of Economics, University of California

Gylfason, T. 1999. Principles of Economic Growth. Oxford: Oxford University Press

Hamilton, K, G. Ruta, A. Markandya, S. Pedroso, P. Silva, M. Ordoubadi, G. -M. Lange, L. Tajibaeva, L. Gronnevet and M. Dyoulgerov. 2005. Where is the Wealth of Nations? Measuring Capital for the 21st Century. Washington, D.C.: World Bank

<http://siteresources.worldbank.org/INTEEI/214578-1110886258964/20748034/All.pdf>

The publication presents estimates of total wealth for nearly 120 countries, using economic theory to decompose the wealth of a nation into its component pieces: produced capital, natural resources and human resources. The wealth estimates provide a unique opportunity to look at economic management from a broader and comprehensive perspective. Its basic tenet

is that economic development can be conceived as a process of portfolio management, so that sustainability becomes an integral part of economic policy making. The rigorous analysis, presented in accessible format, tackles issues such as growth, development and equity. The paper is organized in four sections. The first part introduces the wealth estimates and highlights the main facts on the level and composition of wealth across countries. The second part analyzes changes in wealth and how they matter for economic policy. The third part deals with the level of wealth, its composition and links to growth and inequality. The last part reviews existing applications of resource and environmental accounting.

Hamilton, K. 2000. Sustaining Economic Welfare: Estimating Changes in Wealth per capita. Policy Research Working Paper No. 2498. Washington, D.C.: Environment Department, World Bank

Hamilton, K. and Clemens, M. 1999. Genuine saving in developing countries. World Bank Economic Review. 13, 2, 33-56

Henninger, N. and Snel, M. 2002. Where are the Poor? Experiences with the Development and Use of Poverty Maps. Washington, D.C.: World Resources Institute. <http://population.wri.org>

Kanbur, R. and L. Squire, 1999. The Evolution of Thinking About Poverty: Exploring The Interactions. Ithaca: Department of Economics, Cornell University

Kraay, A. 2004. When is Growth Pro-Poor? Evidence from a Panel of Countries. Policy Research Working Paper 3225. Washington, D.C.: World Bank
http://poverty2.forumone.com/files/15173_Kraay_PPG_Dec04.pdf

Growth is pro-poor if the poverty measure of interest falls. According to this definition there are three potential sources of pro-poor growth: (a) a high growth rate of average incomes; (b) a high sensitivity of poverty to growth in average incomes; and (c) a poverty-reducing pattern of growth in relative incomes. I empirically decompose changes in poverty in a sample of developing countries during the 1980s and 1990s into these three components. In the medium- to long-run, most of the variation in changes in poverty can be attributed to growth in average incomes, suggesting that policies and institutions that promote broad-based growth should be central to the pro-poor growth agenda. Most of the remainder of the variation in changes in poverty is due to poverty reducing patterns of growth in relative incomes, rather than differences in the sensitivity of poverty to growth in average incomes. Cross-country evidence provides relatively little guidance as to the policies and institutions that promote these other sources of pro-poor growth.

Kunte, A., K. Hamilton, K., Dixon, J. and Clemens, M. 1998. Estimating National Wealth: Methodology and Results. Paper No. 57., Environmental Economics Series, Washington, D.C.: World Bank

Lopez, J. 2004. Pro-poor Growth: a Review of What We Know (and What We Don't). Washington, D.C.: World Bank. Mimeo
http://www.nadel.ethz.ch/lehre/ppg_review.pdf

Over the past few years pro-poor growth has become a very popular topic among development practitioners. This despite the fact that in many cases we do not even know what other people mean by pro-poor growth. Is it growth that leads to income redistribution or instead growth that leads to poverty reduction? More importantly, what do we know (and what we don't) about how we can achieve it? This paper addresses these questions through a survey of the existing literature. To focus the debate, the paper first reviews the different definitions being used in practice. Then it divides contributions to the pro-poor growth literature into three different groups. First, it considers papers that have explored the relative role played by growth and inequality in reducing poverty. Second, it reviews works that have focused on the growth-inequality relationship paying attention to both directions of causality. The third group of reviewed papers is less related to the mechanics of what Bourguignon (2004) refers to as the poverty-growth-inequality triangle and more to the policies that countries should pursue in a successful poverty reduction strategy.

Perotti, R. 1996. Corruption and growth. Growth, income distribution and democracy. What the data say. Journal of Economic Growth. 1(2): 149-187

Ravallion. M. 2004. Pro-Poor Growth: A Primer. World Bank Policy Research Working Paper 3242. Washington, D.C.: World Bank

Ray, D. 1998. Development Economics. Princeton: Princeton University Press

Rodrik, D. 2000. Development Strategies for the Next Century. Economics Department, Harvard University. Mimeo

Sagasti, F., K. Bezanson and F. Prada, with K. Blockus, U. Casabonne, A.T. Lima and J. Salop, 2005. The Future of Development Financing: Challenges, Scenarios and Strategic Choices. Brighton: Report to the Global Development Studies Expert Group on Development Issues (EGDI) Secretariat, Ministry for Foreign Affairs, Sweden, by the Institute of Development Studies

http://www.conservationfinance.org/Documents/CF_related_papers/the_future_of_dev_fina_fuII_paper.pdf

At the beginning of the 21st century the international development financing 'system' is really not much of a system. It is rather a collection of disjointed entities that lack coherence, often work at cross purposes and are not up to the task of mobilising finance in the amounts and ways required to assist a growing diversity of developing countries in their efforts to reduce poverty and improve living standards. This publication looks at the system's evolution, new initiatives and suggested scenarios for improvement along with required policy change.

Sen, A. 1981. Poverty and Famines: An Essay on Entitlement and Deprivation. Oxford: The Clarendon Press

Sen, A. 1999. Development as Freedom. New York: Alfred Knopf

Sen, A. 1987. Hunger and Entitlements: Research for Action. Helsinki: United Nations University – World Institute for Development Economics Research

Siegel, P. 2005. Using an Asset-based Approach to Identify Drivers of Sustainable Rural Growth and Poverty Reduction in Central America: a Conceptual Approach. Policy Research Working Paper 3475. Washington, D.C.: World Bank

http://wdsbeta.worldbank.org/external/default/WDSContentServer/IW3P/IB/2005/01/19/000160016_20050119144447/Rendered/PDF/WPS3475.pdf

The asset-based approach considers links between households' productive, social, and locational assets; the policy, institutional, and risk context; household behaviour as expressed in livelihood strategies; and well-being outcomes. For sustainable poverty reducing growth, it is critical to examine household asset portfolios and understand how assets interact with the context to influence the selection of livelihood strategies, which in turn determine well-being. Policy reforms can change the context and income-generating potential of assets. Investments can add new assets or increase the efficiency of existing household assets, and also improve households' risk management capacity to protect assets. After all is said and done, a household's asset portfolio will determine whether growth and poverty reduction can be achieved and sustained over time. The asset-based framework is amendable to different analytical techniques. Siegel suggests combining quantitative and qualitative spatial and household level analyses (and linked spatial and household level analyses) to deepen understanding of the complex relationships between assets, context, livelihood strategies, and well-being outcomes.

Swanson, A. and L. Lundethors, 2003. Public Environmental Expenditure Reviews (PEERS). Environment Strategy Papers No. 7. Washington, D.C.: The World Bank

Wagstaff, A. 1999. Inequalities in Child Mortality in the Developing World. How Large Are They? How Can They Be Reduced? Brighton: University of Sussex

World Bank. 2003. World Development Report 2003. Oxford: Oxford University Press

World Bank. 2004. World Development Indicators. Washington, D.C.: World Bank

2.6 Governance, institutions and social capital

Barrett, C., D Lee and J. McPeak. 2005. Institutional arrangements for rural poverty reduction and resource conservation. World Development. 33 (2): 193-197

Can be purchased from <http://ideas.repec.org/a/eee/wdevel/v33y2005i2p193-197.html>

This paper introduces a special issue featuring a set of papers on institutional arrangements for reconciling rural poverty reduction with renewable natural resources conservation in the low-income tropics. Collectively, these papers make four core points. First, synergies do not naturally emerge just because rural poverty reduction and renewable natural resources conservation are each appealing goals with common drivers and some intrinsic interlinkage. Second, it matters less which rules a community or country adopts than how well they monitor and enforce the rules they set. Third, flexibility and adaptability in design are critical to establishing cooperative partnerships that can advance both conservation and development goals. Fourth, multiscale approaches are commonly desirable.

Cullis, A. and C. Watson. 2005. Winners and Losers: Privatising the Commons in Botswana. Securing the Commons No. 9. London: IIED

<http://www.reconcile-ea.org/pub/STC09.pdf>

In recent years, the “Botswana model” of rangeland policy has been heralded by many as a successful example of government intervention to improve the performance of the livestock sector. The simplicity of the theoretical assumptions underpinning the “model” (the so-called “tragedy of the commons” theory) and of the policy implications that it entails (privatisation of common rangelands), make Botswana’s experience an appealing example for policy makers and donor agencies alike across Africa. However, research conducted in the 1980s and the 1990s has demonstrated the limits of tragedy-of-the-commons arguments, and has led to a shift in thinking on range ecology (Behnke and Scoones, 1993). In addition, research undertaken in Botswana over the past two decades has shown the shortcomings of Botswana’s rangeland policy and raised important questions as to its real social, economic and environmental effects. This paper reviews Botswana’s experience with the privatisation of the commons, drawing on available literature. While several studies were carried out in the 1990s, there is very little up-to-date information on this issue. Therefore, after having reviewed available data and evidence, we will identify key issues for further research on the ground.

Dasgupta, P., 2005. The Economics of Social Capital. Discussion Paper 201. Stockholm: The Beijer International Institute of Ecological Economics

<http://www.beijer.kva.se/publications/pdf-archive/Disc201.pdf>

The idea of social capital sits awkwardly in contemporary economic thinking. Although it has a powerful, intuitive appeal, social capital has proven hard to track as an economic good. Among other things, it is fiendishly difficult to measure; not because of a recognised paucity of data, but because we don't quite know what we should be measuring. Comprising different types of relationships and engagements, the components of social capital are many and varied and, in many instances, intangible. The author suggests that social capital is best seen as interpersonal networks, nothing more; and that we should assess the quality of that capital by studying what networks are engaged in. Some would be found to be progressive, others reactionary, yet others violent. Determining the right interplay between interpersonal networks and the impersonal public institutions remains the central problem of the social sciences.

Grafton, R. and S. Knowles. 2004. Social capital and national environmental performance: a cross-sectional analysis. Journal of Environment and Development. 13(4): 336-70

http://een.anu.edu.au/download_files/een0206.pdf

Using cross-country data from a sample of low, middle and high-income countries, the paper provides the first empirical test of the empirical relationships between national measures of social capital (civic and public), social divergence and social capacity upon various indicators of national environmental performance. The results indicate a possible link between public social capital (democracy and corruption) and effective national environmental policies and the pivotal effects of economic and demographic determinants on national environmental performance. The policy implication is that improved national environmental performance may be best achieved by encouraging reductions in emissions and input intensities and improving the quality of public administration and democratic accountability.

Gray-Molina, G., W. Jimenéz, E Pérez de Rada and E. Yáñez. 2001. Poverty and assets in Bolivia: What role does social capital play? In Attanasio, O and M. Szekely (eds.) 2001. Portrait of the Poor: An Assets-Based Approach. Baltimore: Johns Hopkins University Press for Inter-American Development Bank. 45-112

Heltberg, R. 2002. Property rights and natural resource management in developing countries. Journal of Economic Surveys. 16(2): 189-226

Can be purchased from <http://www.blackwell-synergy.com/links/doi/10.1111/1467-6419.00164/abs/>

This essay surveys the literature on property rights and natural resource management in developing countries. Focus is on policy relevant discussions concerning collective action, property regimes, local institutions for natural resource management, the evolution of individual property rights to land, land titling by government and poverty–environment linkages. The tendency to draw policy conclusions from simplistic analysis is criticised, and the need for more credible empirical research is highlighted.

Islam, J., D. Kaufmann and L. Pritchett. 1995. Governance and Returns on Investment. Policy Research Working Paper 1550. Washington, D.C.: World Bank

Kaufman, D., A. Kraay and M. Mastruzzi. 2005. Governance Matters IV: Governance Indicators for 1996-2004. Policy Research Working Paper 3630. Washington, D.C.: World Bank

Knack, S. and P. Keefer. 1997. Does social capital have an economic pay-off? A cross-country investigation. Quarterly Journal of Economics. 112: 1251-1288

López, R. 2003. The policy roots of socioeconomic stagnation and environmental implosion: Latin America 1950-2000. World Development 31(2): 259-280

Can be purchased from <http://www.sciencedirect.com/science/article/B6VC6-47K2GK3-1/2/3f1224e5897199e4ecd37c705fd30354>

The persistence of growth and its equity and environmental effects heavily depend on the composition of asset investments. Physical, human, and natural capital are the key assets behind the development process. Market failures tend to affect the accumulation of such assets asymmetrically, leading to underinvestment in human and natural capital. Public policy in Latin America has generally exacerbated such market failures by promoting physical capital investments using massive public subsidies instead of relying on the expansion of public and semipublic assets that complement physical capital. The result: economic stagnation, deep social inequities and environmental destruction.

Lopez, R. and S. Mitra. 2000. Corruption, pollution, and the environmental Kuznets curve. Journal of Environmental Economics and Management. 40: 137-150

<http://fiesta.bren.ucsb.edu/~aloret/Lectures/EnvironmentalEconomics/Kuznetsas1/Lopez%20JEE%202000.pdf>

This paper examines the implications of corruption and rent-seeking behavior by the government for the relationship between pollution and growth. Cases of both cooperative and non-cooperative interaction between the government and the private firm are studied. It is shown that corruption is not likely to preclude the existence of an inverted-U-shaped-Kuznets environmental curve under both these cases. However, for any level of per capita income the pollution levels corresponding to corrupt behavior are always above the socially optimal level. Further, the turning point of the Kuznets curve takes place at income and pollution levels above those corresponding to the social optimum.

Lopez-Claros, A., and S. Zahidi, 2005. Women's Empowerment: Measuring the Global Gender Gap. World Economic Forum: Geneva

Mauro, P. 1995. Corruption and growth. Quarterly Journal of Economics. 110: 681-712

Ostrom, E. 1990. Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge: Cambridge University Press

Paldam, M. and G. Svendsen. 2000. An essay on social capital: looking for the fire behind the smoke. European Journal of Political Economy. 16: 339-366

Pretty, J. and H. Ward. 2001. Social capital and the environment. World Development. 29: 209-227

<http://www.essex.ac.uk/bs/staff/pretty/Soc%20Cap%20Env%20-%20WD%20paper.pdf>

For as long as people have managed natural resources, they have engaged in collective action. But development assistance has paid too little attention to how social and human capital affects environmental outcomes. Social capital comprises relations of trust, reciprocity, common rules, norms and sanctions, and connectedness in institutions. Recent years have seen remarkable advances in group formation, with in the past decade some 408,000-478,000 groups emerging with 8.2-14.3 million members in watershed, irrigation, micro-finance, forest,

and integrated pest management, and for farmers' research. A new typology describes the evolution of groups through three stages, and indicates what kinds of policy support are needed to safeguard and spread achievements.

Putnam, R., R. Leonardi and T. Nanetti. 1993. *Making Democracy Work*. Princeton: Princeton University Press

Rose-Ackerman, S. 1999. *Corruption and Government: Causes, Consequences and Reform*. Cambridge: Cambridge University Press

Stevenson, G. 1991. *Common Property Economics: A General Theory and Land Use Applications*. Cambridge: Cambridge University Press

3. Natural resources and pollution

This section contains references on the following issues:

- Air pollution
- Climate change
- Coastal and marine
- Forests (timber and NTFP)
- Land use and land degradation
- Wetlands and water
- Wildlife and protected areas.

3.1 Air pollution

Cifuentes, L., V. H. Borja-Aburto, N. Gouveia, G. Thurston, and D. L. Davis, 2001. Assessing the Health Benefits of Urban Air Pollution Reductions Associated with Climate Change Mitigation (2000-2020): Santiago, Sao Paulo, Mexico City, and New York City. Environmental Health Perspectives Supplements Volume 109, Number S3

http://www.epa.gov/ies/documents/general/cifuentes.pdf?bcsi_scan_EC783A0C3C997A81=0&bcsi_scan_filename=cifuentes.pdf

To investigate the potential local health benefits of adopting greenhouse gas (GHG) mitigation policies, the authors develop scenarios of GHG mitigation for México City, México; Santiago, Chile; São Paulo, Brazil; and New York, New York, USA using air pollution health impact factors appropriate to each city. These are generated from published scientific literature including local studies in the cities concerned. The authors estimate that the adoption of readily available technologies to lessen fossil fuel emissions over the next two decades in these four cities alone will reduce particulate matter and ozone and avoid approximately 64,000 (95% confidence interval [CI] 18,000–116,000) premature deaths (including infant deaths), 65,000 (95% CI 22,000–108,000) chronic bronchitis cases, and 37 million (95% CI 27–47 million) person-days of work loss or other restricted activity. These findings illustrate that GHG mitigation can provide considerable local air pollution–related public health benefits to countries that choose to abate GHG emissions by reducing fossil fuel combustion.

Cohen, A.J., H. R. Anderson, B. Ostro, K. D. Pandey, M. Krzyzanowski, N. Künzli, K. Gutschmidt, C. A. Pope III, I. Romieu, J. M. Samet and K. R. Smith, 2004. Mortality Impacts of Urban Air Pollution. Chapter 17 of Ezzati, M., A.D.Lopez, A. Rodgers and C.J.L. Murray (eds), 2004. *Comparative Quantification of Health Risks: Global and Regional Burden of Disease due to Selected Major Risk Factors*. Geneva: World Health Organization. (Not available on the web)

This chapter presents estimates of the contribution of urban air pollution to the global burden of disease. There are considerable challenges involved because of the lack of information on both effects on health and on exposures to air pollution in many parts of the world. Particulate matter is chosen as the indicator of exposure to pollution because it has been linked consistently with health effects and because its levels can be estimated worldwide. The results indicate that the impact of urban air pollution on the burden of disease in the cities of the world is large, but this is likely to be an underestimate of the actual burden, on the basis of an assessment of sources of uncertainty. There is also considerable variation in the estimates among the 14 sub regions, with the greatest burden occurring in the more polluted and rapidly

growing cities of developing countries. The authors estimate that in the year 2000 air pollution in urban areas worldwide, in terms of concentrations of PM, caused about 3% of mortality attributable to cardiopulmonary disease in adults, about 5% of mortality attributable to cancers of the trachea, bronchus and lung, and about 1% of mortality attributable to ARI in children. This amounts to about 0.80 million premature deaths (1.4% of the global total) and 6.4 million YLL (0.7% of the global total). This burden occurs predominantly in developing countries, with 39% of attributable YLL occurring in the WPR-B (Western Pacific including China, Cambodia, Lao and Philippines amongst others) and 20% in SEAR-D (includes Bangladesh, Bhutan, India and Nepal amongst others). The highest proportions of the total burden occurred in WPRB and EUR-B (mainly Eastern Europe and CIS), where urban air pollution caused 0.7–1.0% of the burden of disease.

Cropper, M.L., N.B. Simon, A. Alberini and P.K. Sharma, 1997. The Health Effects of Air Pollution in Delhi. Policy Research Working Paper No. 1860, World Bank

http://www.worldbank.org/nipr/work_paper/1860/delhipap.pdf

This paper reports the results of a study relating levels of particulate matter to daily deaths in Delhi, India between 1991 and 1994. The authors found a positive, significant relationship between particulate pollution and daily non-traumatic deaths, as well as deaths from certain causes (respiratory and cardiovascular problems) and for certain age groups. In general, these impacts are smaller than those estimated for other countries, where on average a 100-microgram per cubic meter increase in total suspended particulates (TSP) leads to a 6-percent increase in nontraumatic mortality. In Delhi, such an increase in TSP is associated with a 2.3 percent increase in deaths. The differences in magnitudes of the effects are most likely explained by differences in distributions of age at death and cause of death, as most deaths in Delhi occur before the age of 65 and are not attributed to causes with a strong association with air pollution. Although air pollution seems to have less impact on mortality counts in Delhi, the number of life-years saved per death avoided is greater in Delhi than in U.S. cities -- because the age distribution of impacts in these two places varies. In the United States particulates have the greatest influence on daily deaths among persons 65 and older. In Delhi, they have the greatest impact in the 15-to-44 age group. That means that for each death associated with air pollution, on average more life-years would be saved in Delhi than in the United States.

Dasgupta, S., K. Hamilton, K. Pandey and D. Wheeler. 2004. Air Pollution During Growth: Accounting for governance and vulnerability. Policy Research Working Paper 3383. Washington, D.C.: World Bank

Dasgupta, S., M. Huq, M. Khaliquzzaman, K. Pandey and D. Wheeler, 2004. Indoor Air Quality for Poor Families: New evidence from Bangladesh. Policy Research Working Paper No. 3393, Development Research Group, World Bank

http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2004/09/16/000160016_2004091617391/1/Rendered/PDF/wps3393.pdf?bcsi_scan_EC783A0C3C997A81=0&bcsi_scan_filename=wps3393.pdf

Poor households in Bangladesh depend heavily on wood, dung and other biomass for cooking. This paper provides evidence on PM10 and PM2.5 concentrations in poor households using new air monitoring data. Stratified sampling was used to select 236 households in urban and peri-urban areas of Dhaka to incorporate representative variations in fuel use, cooking arrangements and structural characteristics that affect ventilation. The results highlight the importance of ventilation factors in the determination of PM10 concentrations. Mud walls have the effect of reducing ventilation and are associated with higher PM10 concentrations than thatched roofs but this depends on the location of cooking, being more marked if the kitchen is inside. After allowing for the effect of ventilation, the authors find significant differences between biomass and clean fuels. Although fuel choice affects indoor air pollution, the results suggest that it is secondary to the role of ventilation factors. The results also indicate that indoor PM10 concentrations are high for many poor families. Only 30% of extreme poverty families use clean fuels even in urban areas where their prices are relatively low, so there is little hope of more widespread adoption of clean fuels in the near future. Use of improved stoves in the sample is very limited and lack of information on them appears to be the major factor contributing to this situation. The sample results show that other measures such as increasing ventilation and changing construction materials may have significant effects on pollutant concentrations even where biomass fuels are used. This suggests considerable scope for cost-effective improvements.

Gouveia, N. and T. Fletcher, 2000. Time Series Analysis of Air Pollution and Mortality: Effects by cause, age and socioeconomic status. Journal of Epidemiology and Community Health 2000; 54 750-755

<http://jech.bmjournals.com/cgi/content/full/54/10/750>

This study aims to investigate the association between outdoor air pollution and mortality in Sao Paulo, Brazil using time series data over the period 1991-1993. All causes all ages mortality showed much smaller associations with air pollution than mortality for specific causes and age groups. In the elderly, a 3-4% increase in daily deaths for all causes and for cardiovascular diseases was associated with an increase in fine particulate matter and in sulphur dioxide from the 10th to the 90th percentile. For respiratory deaths the increase in mortality was higher (6%). Cardiovascular deaths were additionally associated with levels of carbon monoxide (4% increase in daily deaths). The associations between air pollutants and mortality in children under 5 years of age were not statistically significant. There was a significant trend of increasing risk of death according to age with effects most evident for subjects over 65 years old. The effect of air pollution was also larger in areas of higher socioeconomic level. The results show a slight increase in risk of death associated with air pollution for the elderly who lived in wealthier areas compared with more deprived ones. These differences were not large enough to be statistically significant. The authors suggest that this reflects weaknesses in the socioeconomic index approach which applies the same score across large and socially heterogeneous districts.

HEI Special Report 15, 2004. Health Effects of Outdoor Air Pollution in Developing Countries of Asia. Public Health and Air Pollution in Asia Program, Health Effects Institute

http://www.healtheffects.org/Pubs/SpecialReport15.pdf?bcsi_scan_EC783A0C3C997A81=0&bcsi_scan_filename=SpecialReport15.pdf

This identifies and summarises more than 135 studies of air pollution and health conducted across Asia and critically reviews 28 studies of short-term exposure to air pollution on daily mortality and hospital admissions for cardio-vascular and respiratory disease. The goals of the study are to provide a partial quantitative summary of what is known about the health effects of outdoor air pollution in Asia (focusing on estimates of the effects of short-term exposure to outdoor air pollution) and to identify gaps in knowledge that should be addressed in future research. From the subset of cities that has been studied most closely, this report indicates that short-term exposure to air pollution is associated with increases in daily mortality and morbidity. Estimated effects are similar to those found in studies of Western countries. A number of gaps in current knowledge are identified. One of these is the role that poverty plays in the health effects of air pollution. Studies examining the link between economic deprivation, air pollution exposure, susceptibility to illness and the risk of mortality and morbidity have not been conducted in Asia and only to a limited extent in North America and Europe. The report concludes that studies of this nature in Asia are needed.

Hughes, G., K. Lvovsky and M. Dunleavy, 2001. Environmental Health in India: Priorities in Andhra Pradesh. Environment and Social Development Unit, South Asia Region, World Bank

http://siteresources.worldbank.org/INDIAEXTN/Resources/Reports-Publications/APHealth.pdf?bcsi_scan_EC783A0C3C997A81=0&bcsi_scan_filename=APHealth.pdf

This report examines the linkages between health, particularly child survival, in Andhra Pradesh, India and the quality of the household environment, addressing both indoor air quality related to cooking fuel use and access to water and sanitation. It estimates the contribution of environmental factors to the burden of disease in Andhra Pradesh based on two methods. The first is a bottom-up approach which assigns different shares of the various components of the total burden of disease to environmental factors based on expert judgment and assessments from the literature. The second method draws from an extensive epidemiological investigation of the determinants of infant and child mortality in India, focusing specifically on the quality of the household environment. The National Family Health Survey of 1992-3 covering almost 90,000 households provides the data for this investigation. A model of child survival was specified using the semi-parametric Cox proportional hazards technique and applied to the survey data to estimate the number of child deaths by state. Additional survival functions were computed for five scenarios of various improvements in the household environment and associated child deaths estimated. However, the authors acknowledge that due to lack of data a variety of factors that could affect the survival of children could not be examined. Application to Andhra Pradesh and interpretation of the results therefore requires some caution.

ITDG, 2002. Reducing Indoor Air Pollution in Rural Households in Kenya: Working with communities to find solutions. The ITDG Smoke and Health project 1998-2001

http://www.itdg.org/html/advocacy/docs/smoke_project_report.pdf

A survey of 50 households was conducted in two locations (25 each) a Maasai community in Kaijado and three communities in West Kenya before and after interventions to reduce indoor air pollution (smoke hoods, eaves spaces, windows, stoves). The report claims that low incomes and wages characterise these locations, presenting data on poverty incidence intensity and severity from a 1994 survey to support this.

Joh, S., 2000. Studies of Health Benefit Estimation of Air Pollution in Korea. Seoul: Korea Environment Institute.

Larson, B.A. and S. Rosen 2000. Households Benefits of Indoor Air Pollution Control in Developing Countries. Prepared for the USAID/WHO Global Technical Consultation on The Health Impacts of Indoor Air Pollution and Household Energy in Developing Countries, May 3-4 2000, Washington DC

http://pdf.dec.org/pdf_docs/Pnacn655.pdf

This paper develops an approach for identifying the benefits to households of implementing indoor air pollution interventions and translating them into a monetary equivalent so that they can be compared to intervention costs. The authors apply this approach to data on emission reductions from use of improved stoves in Guatemala and Kenya to estimate the change in mortality risk and the value placed by a typical household on this change. The estimated annual benefits per person are US\$469 for Guatemala and US\$638 for Kenya. This compares favourably to typical costs of improved stoves of US\$8-21 reported in the literature. The authors emphasise that the numbers given are illustrative only as examples of how to estimate benefits. An example of the value of reducing acute respiratory illness (ARI) using data from Pakistan is given. From the literature on health impacts of improved stoves it is assumed that an improved stove reduces annual ARI risk for children by 50%. As children under five in Pakistan have an average of one case of ARI per child per year, it is taken that an improved stove reduces ARI by 0.5 cases per under five child per year. Two approaches are taken to valuation: medical treatment costs and benefits transfer of willingness to pay to avoid morbidity. Medical treatment costs of a typical case of pneumonia in a public health facility in Pakistan have been estimated in the literature at US\$67. This provides a lower bound value for households which seek treatment and actually pay these costs. A present value of the 0.5 reduction in annual cases of ARI over 5 years for a child is estimated at US\$110 using a 20% discount rate.

Laxmi, V., J. Parikh, S. Karmakar and P. Dabrase, 2003. Household Energy, Women's Hardship and Health Impacts in Rural Rajasthan, India: Need for sustainable energy solutions. Energy for Sustainable Development, Volume VII, No. 1 March 2003

http://www.ieiglobal.org/esdvol7no1/householdenergy.pdf?bcsi_scan_EC783A0C3C997A81=0&bcsi_scan_filename=householdenergy.pdf

The use of unprocessed bio-fuels for cooking is interlinked with many other factors such as socio-economic conditions, availability of alternative fuels, cooking practices, health impacts, gender equality, and housing characteristics. To examine these factors and their linkages, the Indira Gandhi Institute of Development Research collected data through a large and comprehensive survey covering a sample of 58,768 individuals in 10,265 rural households from three states in northern India, viz., Uttar Pradesh, Rajasthan and Himachal Pradesh. This paper, reports on analysis of the data collected only from the rural areas of Rajasthan, covering 6,403 females and 5,552 males from 1,989 households in 13 villages, during the period end April to mid-June 2000. The results showed losses incurred because of cooking fuels, including work days spent, expenditure on illness and lost working days due to illness are Rs. 29 billion per year and that the health impacts of the use of bio-fuels are quite high for adult women. The linkages between many socio-economic variables and respiratory symptoms in adult women show that health impacts can be reduced by increasing female literacy, reducing the use of bio-fuels, and changing the housing design. Action-oriented programmes should include a treatment strategy at public health centres to help suffering women.

Li, J., D. Streets, S. Guttikunda, G. Carmichael, Y.S. Chang and V. Fung, 2002. Health Benefits From Air Pollution Controls In Shanghai. The Sinosphere Journal, Volume 4, Issue 1, July 2002. The Professional Association For China's Environment (PACE)

http://www.efchina.org/documents/sinosphere_July_2002.pdf?bcsi_scan_EC783A0C3C997A81=0&bcsi_scan_filename=sinosphere_July_2002.pdf

The study examines the potential economic benefits from improved population health as air pollution levels (PM₁₀) decline, in the city of Shanghai, one of the most rapidly growing and prosperous metropolitan areas in China. 1995 is selected as the base year to establish energy and emissions inventory and project out to the year 2020 to compare the policy options associated with a business-as-usual (BAU) pathway and two alternative scenarios. The business as usual scenario assumes that conventional pulverized coal power plants with flue gas desulphurization will be used to meet electricity demand Control Scenario for Power Generation (C1) This scenario assumes that all new power generation capacity coming on line in the period 2010-2020 will be state of the art integrated gasification combined cycle technology for coal combustion. The incremental cost of this scenario is US\$395 million (it is not clear whether this is annual figure or a discounted NPV figure). The industrial scenario assumes that all industrial coal use is banned in the Shanghai urban area by 2020, that 75% of coal-fired production activities will close down and that the remaining 25% will be relocated to neighbouring counties. The total cost of this scenario is US \$94 million in 2020 (It is not clear whether this is annual figure or a discounted NPV figure). A linear relationship is assumed between health response to air pollution for different types of health effect acute mortality, chronic bronchitis, hospital visits and emergency room visits). Dose-response coefficients are derived from existing epidemiological studies. The study shows that the ratio of health benefits and investment costs is in the range of 1-5 for the power-sector control policy and 2-15 for the industrial-sector initiative.

Li, J., S. Guttikunda, G. Carmichael, D. Streets, Y-S Chang and V. Fung, 2004. Quantifying the Human Health Benefits of Curbing Air Pollution in Shanghai. *Journal of Environmental Management*, Vol. 70, pp. 49-62

Lipfert, F.W., 2004. Air pollution and Poverty: Does the sword cut both ways? Editorial - Health and Pollution. *Journal of Epidemiology and Community Health* 2004, 58: 2-3

<http://jech.bmjournals.com/cgi/content/extract/58/1/2>

This is a synthesis and review of three papers in the same journal issue on relations between socio-economic status, health and air quality but also draws from other published studies to substantiate the arguments made. One of the three papers is on Canada (Jerrett et al), while the other two are on Brazil (Martins et al; Gouveia et al). Lipfert notes that most time series studies are based on entire cities and spatially averaged air quality, in order to maximise statistical power and to preclude the necessity of assigning individual deaths to specific air quality monitors. Time series studies avoid socioeconomic status (SES) confounding by design, as those factors do not vary on a daily basis. However, many air pollutants tend to vary in concert, especially those that are co-emitted by common sources, thus making it difficult to identify the most probable causal agent. Cross sectional studies may have less co-pollutant collinearity, but can suffer from SES confounding to the extent that SES may tend to decrease with residential proximity to major pollution sources. Lipfert argues that all of these issues are in play among these three studies. For example, Lipfert points out that the Martins et al paper does not address the effect of exposure to other pollutants such as NO₂ which is particularly high in Sao Paulo. Lipfert argues that the poor, as well as being more exposed to air pollution as suggested by these three studies, may also be more susceptible to adverse health effects from pollution because of differences in underlying health status and access to medical care. He draws on case studies from the US to support these arguments. He concludes that the real villain is poverty and the socioeconomic conditions it produces.

Martins, M.C.H., F.L. Fatigati, T.C. Véspoli, L.C. Martins, L.A.A Pereira, M.A. Martins, P.H.N. Saldiva and A.L.F Braga, 2004. Influence of Socioeconomic Conditions on Air Pollution Adverse Health Effects in Elderly People: An analysis of six regions in São Paulo, Brazil. *Journal of Epidemiology and Community Health* 2004, 58: 41-46

<http://jech.bmjournals.com/cgi/content/full/58/1/41>

This study aims to determine whether socioeconomic status modifies the effect of air pollution, focusing on particulate matter (PM₁₀) on the mortality of elderly people. It is argued that elderly people do not move around the city very much compared to other age groups and that therefore they are predominantly exposed to the air pollution of their own neighbourhood. The overall percentage increase in respiratory mortality in the six regions was 5.4% (95% CI 2.3 to 8.6). The effect of PM₁₀ was negatively correlated with both percentage of people with college education and high family income, and it was positively associated with the percentage of

people living in slums. These results suggest that socioeconomic deprivation represents an effect modifier of the association between air pollution and respiratory deaths.

Mehta, S. and Shahpar C., 2004. The health benefits of interventions to reduce indoor air pollution from solid fuel use: a cost effectiveness analysis. Energy for Sustainable Development, Volume VIII, No. 3, September 2004

<http://www.ieiglobal.org/ESDVol8No3/cost-effectiveness.pdf>

The air pollution-related health benefits of interventions to reduce indoor air pollution from cooking and heating with solid fuels are evaluated in South and South-east Asia, Africa, and the Americas using generalized cost-effectiveness methodology. Three scenarios are assessed with all intervention scenarios are compared with the current situation, i.e., the “business as usual” scenario where current exposures to indoor air pollution from solid fuel use would be maintained. Two major health outcomes associated with indoor air pollution are addressed, namely acute lower respiratory infections (ALRI) in young children under five years of age and chronic obstructive pulmonary disease (COPD) in adults over twenty. Estimates of exposure at the regional level (Smith et al 2004 see below) are combined with estimates of the disease burden to estimate region-specific disease burdens for exposed and unexposed populations. From a meta-analysis of existing studies, the relative risk of lower respiratory infection in children and relative risk of COPD in adults in solid fuel using households was estimated. This analysis offers further support for the argument that, from a public health point of view, there should be a continued emphasis on the promotion of improved stoves, as well as other locally appropriate means to reduce exposures within solid fuel-using households, until everyone can be given access to cleaner fuels.

O'Neill, M.S., M. Jerrett, I. Kawachi, J. I. Levy, A. J. Cohen, N. Gouveia, P. Wilkinson, T. Fletcher, L. Cifuentes and J. Schwartz with input from participants of the Workshop on Air Pollution and Socioeconomic Conditions. 2003. Health, Wealth and Air Pollution: Advancing theory and methods. Environmental Health Perspectives Volume 111, Number 16

<http://www.pubmedcentral.gov/articlerender.fcgi?tool=pubmed&pubmedid=14644658>

This article reviews methodologies and conceptual approaches in the fields of air pollution and social epidemiology; proposes theories and hypotheses about how air pollution and socioeconomic factors may interact to influence health, drawing on studies conducted worldwide; and discusses methodological issues in the design and analysis of studies to determine whether health effects of exposure to ambient air pollution are modified by socioeconomic condition. The authors note that despite international interest in the effects of socioeconomic disparities and ambient air pollution on health, and growing awareness of the importance of considering both in epidemiologic research, few studies have looked carefully at how these factors interact with one another. The authors conclude that the majority of studies evaluating individual-level characteristics did show effect modification with higher effects (in general) among those of lower SEP, by race, or in those having medical characteristics associated with lower SEP. Low educational attainment seems to be a particularly consistent indicator of vulnerability in these studies. Those studies using group/county level indicators did not show important effect modification, as a whole; these results may relate to the relatively coarse resolution of these variables. However, the study from Brazil, showed that air pollution effects were larger in districts of higher SEP. The authors observe that while many studies have reported modification of health effects via SEP variables, few have explicitly examined why this modification occurs.

Pearce, D. W., 1996. Economic Valuation and Health Damage from Air Pollution in the Developing World. *Energy Policy*, Vol. 24, No. 7, pp. 627-630

Romieu, I., and M. Hernandez-Avila, 2003. Air Pollution and Health in Developing Countries: A Review of Epidemiological Evidence. Chapter 3 in McGranahan, G. and F. Murray (eds.), 2003. Air Pollution and Health in Rapidly Developing Countries. Sterling, VA, USA: Earthscan

This chapter reviews the evidence on air pollution and health impacts in developing countries. It finds that for particulate pollution, various studies have documented increased mortality, increased emergency visits for respiratory problems, higher frequency of respiratory symptoms and low pulmonary function. The evidence on ozone impacts is less consistent. Few studies have been reported for carbon monoxide but the limited data available suggest that exposure is prevalent and may be associated with prematurity and intra-uterine death. The authors conclude that the epidemiological evidence suggests that air pollution affects both mortality and morbidity rates in developing countries and generates high social costs associated with premature death and a decrease in the quality of life.

Smith, K.R., S. Mehta and M. Maeusezahl-Feuz, 2004. Indoor air pollution from household use of solid fuels. Chapter 18 of Ezzati, M., A.D.Lopez, A. Rodgers and C.J.L. Murray (eds), 2004. Comparative Quantification of Health Risks: Global and Regional Burden of Disease due to Selected Major Risk Factors. Geneva: World Health Organization

This chapter summarizes the methodology used to assess the burden of disease caused by indoor air pollution from household use of solid fuels. In order to be consistent with the epidemiological literature, binary classifications of household use of solid fuels (biomass and coal) were used as a practical surrogate for actual exposure to indoor air pollution. Specifically, household solid fuel use was estimated at the national level using binary classifications of exposure to household fuel use, i.e. solid fuel and non-solid fuel (gas, kerosene, electricity). The authors estimated exposure to smoke from solid fuel by combining a number of national surveys of household fuel use into a regression model that predicts use according to independent, development-related variables, such as income and urbanization. Although this method was necessary owing to the current paucity of quantitative data on exposure, the authors acknowledge that it overlooks the large variability of exposure within households. As pollution emissions from the use of solid fuel may not always indicate high exposures, exposure estimates have been adjusted by a second term, the ventilation factor, which is based on qualitative measures of ventilation. Estimates of relative risk obtained from epidemiological studies were combined in meta-analyses for three disease end-points for which there is strong evidence of an association with use of solid fuels: acute lower respiratory infections (ALRI) in children aged <5 years, chronic obstructive pulmonary disease (COPD) and lung cancer (estimates for lung cancer are only for use of coal).

van der Klaauw, B. and L. Wang, 2004. Child Mortality in Rural India. Policy Research Working Paper No. 3281, World Bank

http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2004/08/25/000160016_20040825095558/Rendered/PDF/wps3281.pdf

This report focuses on the determinants of infant and child mortality in rural areas of India and the importance of household environment conditions. It constructs a flexible duration model framework that allows for impact of socioeconomic and environmental factors to change with a child's age and takes into account frailty both at the level of the child and of the family. The authors use the estimated model to estimate the impact on child mortality of policy interventions such as provision of piped water, electricity, increasing mothers' education, and switching to clean cooking fuels. These indicate that child mortality can be reduced substantially, particularly by improving the education of women and reducing indoor air pollution caused by cooking fuels. In addition, providing access to electricity and sanitation facilities can reduce under-five-years mortality rates significantly. Using cost data on interventions from a previous study on Andhra Pradesh (Hughes, Lvovsky and Dunleavy 2001), the authors compare the cost-effectiveness of three interventions, piped water, toilet facilities and switching to clean fuels. In the case of infant mortality, switching to clean fuels is the most cost-effective option for reducing infant mortality. For reducing child mortality under 5, access to piped water is the most cost-effective.

Von Schirnding, Y., N. Bruce, K. Smith, G. Ballard-Tremeer, M. Ezzati. and K. Lvovsky, 2002. Addressing the Impact of Household Energy and Indoor Air Pollution on the Health of the Poor: Implications for Policy Action and Intervention Measures. Paper prepared for the Commission on Macroeconomics and Health. World Health Organization

http://www.who.int/mediacentre/events/H&SD_Plaq_no9.pdf

This paper first reviews the evidence for health effects from indoor air pollution, drawing from published studies. It then presents estimates of the global burden of disease from indoor air pollution in terms of global mortality and DALYs lost. It estimates that 1.8 million deaths and 53 million DALYs are attributable to solid fuel use in the early 1990s. It then examines policy and intervention measures that could improve the health of the poor, presenting evidence on cost effectiveness and the limited evidence on cost benefit.

Warwick, H. and A. Doig, 2004. Smoke: the Killer in the Kitchen – Indoor Air Pollution in Developing Countries. London: ITDG Publishing

3.2 Climate change

ADB, AfDB, BMZ, DFID, DGIS, EC, GTZ, OECD, UNEP, UNDP and World Bank 2003. Poverty and Climate Change: Reducing the vulnerability of the poor through adaptation. UK: Department for International Development (DFID)

Part 1 at <http://www.undp.org/energy/docs/poverty-and-climate-change-72dpi-part1.pdf>

Part 2 at <http://www.undp.org/energy/docs/poverty-and-climate-change-72dpi-part2.pdf>

Examines how climate change is likely to affect the existing vulnerability of poor people to climate-related impacts drawing from IPCC 2001 but also some other sources eg: Gallup and Sachs 2000 – Using modelling based on IPCC scenarios they predict that temperature rise by 2100 will lead to increases in potential breeding grounds for malaria in parts of Brazil, Southern Africa and the Horn of Africa but malaria risk may fall in parts of Namibia and the West African Sahel because of excessive heat.

Bollen, J.C., A.J.G Manders and P.J.J. Veenendaal, 2004. How Much Does a 30% Emission Reduction Cost? Macroeconomic effects of post-Kyoto climate policy in 2020. CPB Document no. 64. The Hague: CPB Netherlands Bureau for Economic Policy Analysis

Dougherty, B., A. Abusuwar and K.A.Razik, 2001. Sudan: Community-based rangeland rehabilitation for carbon sequestration and biodiversity. Report of the Terminal Evaluation

From 1992 to 2000, 17 villages in Bara Province, Western Sudan took part in a GEF-funded project to rehabilitate over-exploited rangelands through the use of community-based natural resource management for the purpose of carbon sequestration, biodiversity and reduction of atmospheric dust. Some project activities were focused on addressing socio-economic conditions to meet near-term survival and production needs of villagers. Results exceeded expectations with 700 ha rehabilitated instead of 100 because of positive leakage – that is, additional communities undertook project activities after observing the benefits. (Note that the original report includes very little information on the costs and benefits in monetary terms of the project. Estimating the cost per tonne of carbon sequestered is problematic because near-term carbon storage has not been adequately verified by the project and there are no plans in place to monitor and verify long-term carbon storage claims. If only direct incremental carbon stored by the end of the project is considered, the cost is very high, about US\$375 per tonne of carbon. If the calculation is made on the carbon storage over 20 years predicted by the project documents, the cost would be US\$3.5 tonne of carbon but this requires an assumption that full local transformation away from cultivation of marginal lands occurs without any future funding support.)

Ellis, J. and F. Gagnon-Lebrun, 2004. The CDM Portfolio: Update on non-electricity projects. Paris: OECD Environmental Directorate/International Energy Agency

http://www.oecd.org/dataoecd/25/32/34008610.pdf?bcsi_scan_EC783A0C3C997A81=0&bcsi_scan_filename=34008610.pdf

Reviews the information on sustainable development benefits provided in project design documents of a selection of proposed Clean Development Mechanisms (CDM) projects and finds that the information is surprisingly limited given that sustainable development is one of the two stated purposes of the CDM. SD Benefits cited include those relating to environment (reduction in emissions to air, land, water, or reduction in solid waste generation, the economy, technology transfer, improved health, community benefits, employment and education. The most widely cited SD benefits are environmental. But some of the proposed projects (including low cost project types eg landfill gas projects in Salvador, Brazil and HFC reduction project in Gujarat India) plan to earmark a small proportion of funds from CER sales for local community development. Another project (NovaGerar) will give 10% of electricity generated to the local community. It is also found that the type, scope and magnitude of SD benefits described in the PDD can vary widely including within a project type.

Holt-Gimenez E., 2001. Measuring farmers agroecological resistance to hurricane Mitch. LEISA Magazine, Issue 17(1): 18-20. ILEIA, the Netherlands

http://www.leisa.info/Fritz/source/getblob.php?o_id=67497&a_id=211&a_seq=0

The study covered 360 communities in 24 departments in Honduras, Nicaragua and Guatemala. From February to May 1999, paired observations of agro-ecological indicators were recorded in 1,804 neighbouring sustainable and conventional farms, mostly in groups of

20, (ten sustainable, ten conventional). Paired observations had to be located in close proximity in the same position in the watershed, with the same slope and other environmental conditions. Agroecological indicators included: topsoil depth, rill and gully erosion, percent vegetation crop losses and structural damage. While there was some local variation, the results indicated higher agroecological resistance on the sustainable farms. Sustainably farmed plots had 20-40% more topsoil, greater soil moisture, less erosion and had experienced lower economic losses than the conventionally farmed plots. Statistical tests showed that in most cases the differences were acceptably significant (0.02-0.05 probability that due to chance) and in some cases highly significant (0.0001 probability that due to chance). However, in areas of steep slopes (>50%), high storm intensity and extreme environmental conditions these differences were not significant. 90% of the conventional farmers participating in the study indicated a desire to adopt their neighbours' sustainable practices.

Hughes, G., 2002. Comparing the Costs of Local Air Pollution with the Effects of Global Climate Change. Paper read to UN Economic Commission for Europe Conference on Economics and Epidemiology, London

IISD, IUCN and Stockholm Environment Institute – Boston Centre, 2003. Livelihoods and Climate Change: Combining disaster risk reduction, natural resource management and climate change adaptation in a new approach to the reduction of vulnerability and poverty. A conceptual framework paper prepared by the task force on Climate Change, Vulnerable Communities and Adaptation. Canada: The International Institute for Sustainable Development. http://www.iisd.org/pdf/2003/natres_livelihoods_cc.pdf

This paper presents examples of investment in adaptation, drawing from existing literature. The authors succinctly elaborate upon some of the main concepts and processes involved, and provide a conceptual basis for action. Specifically, they present a rationale for adopting an adaptation approach that reduces climate-related vulnerability through ecosystem management and restoration activities that sustain and diversify local livelihoods. This calls for a greater emphasis on micro-level approaches to vulnerability reduction and a closer collaboration between disciplines, agencies and sectors to scale up these activities and integrate them into emerging policy frameworks.

McMichael, J.A., 2003. Climate change and human health – risks and responses. Summary. WHO, WMO and UNEP <http://www.who.int/globalchange/climate/summary/en/index.html>

The summary argues that some health impacts from climate change are already detectable. Indeed the World Health Organisation estimated in its "World Health Report" 2002 that climate change was estimated to be responsible in 2000 for approximately 2.4% of worldwide diarrhoea, and 6% of malaria in some middle-income countries." It acknowledges though that small changes attributable to climate change are hard to identify against a background of changes in other causal factors. (See article by Reiter below for alternative view). The summary mainly centres on potential health impacts, citing the IPCC's conclusion that "climate change would cause heat-related mortality and morbidity, decreased cold-related mortality in temperate countries, greater frequency of infectious disease epidemics following floods and storms, and substantial health effects following population displacement from sea level rise and increased storm activity." For each type of impact different groups are particularly vulnerable. Thermal extremes are most likely to affect the poor and the elderly. The summary argues that there is historical evidence of associations between climatic conditions and infectious diseases for example in India the link between malaria and extreme climatic events. Malaria epidemic risk has been shown to increase around five-fold in the year after an El Niño event. Modelling of malaria shows that temperature increases of 2-3 degrees centigrade would increase the number of people at risk from malaria by 3-5%, i.e. several hundred million people and would increase seasonal duration.

Mendelsohn, R., A. Basist, P. Kurukulasuriya and A. Dinar, 2004. Climate and Rural Income. In R. Mendelsohn, A. Dinar, A. Basist, P. Kurukulasuriya, M. Ajwad, F. Kogan and C. Williams, 2004. Cross Sectional Analyses of Climate Change Impacts. Policy Research Working Paper 3350. Washington, D.C.: World Bank

Mourato, S. and J. Smith, 2002. Can Carbon Trading Reduce Deforestation by Slash-and-burn Farmers? Evidence from the Peruvian Amazon. In D. W. Pearce, C. Pearce and C. Palmer (eds).

Valuing the Environment in Developing Countries: Case Studies. Cheltenham: Edward Elgar, pp. 358-376

Nordhaus, W. and J. Boyer, 2000. Warming the World: Economic models of global warming. Cambridge, Mass: MIT Press

Parry, M.L., N.W. Arnell, T. McMichael, R. Nicholls, P. Martens, S. Kovats, M. Livermore, C. Rosenzweig, A. Iglesias and G. Fischer, 2001. Millions at Risk: Defining critical climate change threats and targets. *Global Environmental Change*, Vol. 11 (3), pp. 181-183

Pearce, D.W., 2005b. The Social Cost of Carbon. In D. Helm (ed). *Climate Change Policy*. Oxford: Oxford University Press, pp. 99-133

Pearce, D.W., W.R. Cline, A. Achanta, S. Fankhauser, R. Pachauri, R. Tol and P. Vellinga, 1996. The Social Costs of Climate Change: Greenhouse damage and the benefits of control. In Intergovernmental Panel on Climate Change, 1995. *Climate Change 1995: Economic and Social Dimensions of Climate Change*. Cambridge: Cambridge University Press, pp. 183-224

Smith, J. and S. Scherr, 2002. Forest Carbon and Local Livelihoods: Assessment of opportunities and policy recommendations. Occasional Paper 37. Bogor: CIFOR

Stern, T., 2003. Policy Instruments for Environmental and Natural Resource Management. Washington, D.C: Resources for the Future

Tol, R. 2002. Estimates of the Damage Costs of Climate Change. Part 1: Benchmark Estimates. *Environmental and Resource Economics*, Vol 21, pp. 47-73

Tol, R. 2005. The Marginal Damage Costs of Carbon-dioxide Emissions. In D. Helm (ed). *Climate Change Policy*. Oxford: Oxford University Press, pp. 152-166

Troni, J., P.M. Costa, N. Haque, H. Rodriguez, A. Sharma, M. Hession, S. Agbey, L. Gunaratne and Y. Sokona, 2002. Moving towards Emissions Neutral Development (MEND): Final Technical Report. Oxford: DFID

http://www.ecosecurities.com/downloads/resource-115.pdf?bcsi_scan_EC783A0C3C997A81=0&bcsi_scan_filename=resource-115.pdf

This examines whether the Clean Development Mechanism can contribute to poverty reduction objectives in four countries: Bangladesh, Colombia, Ghana and Sri Lanka. Project partners in consultation with national steering groups selected ten proposed CDM projects covering a range of sectors. Projects were given scores on different criteria in the light of poverty baselines and development priorities. The highest ranking projects were in the rural sector aimed at providing energy services to unelectrified communities; and increasing the returns from agricultural and forestry activities.

Reiter, P., 2005. Climate Change and Highland Malaria in the Tropics. Abstract of presentation to Avoiding Dangerous Climate Change, International Symposium on the Stabilisation of Greenhouse Gas Concentrations, Hadley Centre, Met Office, Exeter

http://www.stabilisation2005.com/posters/Reiter_Paul.pdf

Reiter (Institut Pasteur) challenges the attribution of the increase in the prevalence of malaria in highland areas of the tropics in recent decades to global warming, arguing that politics, economics and human activities, not climate, are the principal determinants of the changing pattern of transmission.

Wigley, T., 1998. The Kyoto Protocol: CO₂, CH₄ and climate implications. *Geophysical Research Letters*, Vol. 25(13), pp. 2285-2288

Winters, P., R. Murgai, E. Sadoulet, A de Janvery and G. Frisvold, 1998. Economic and Welfare Impacts of Climate Change on Developing Countries. *Environmental and Resource Economics*, Vol. 12, pp. 1-24

World Neighbours, 2000. Reasons for Resiliency: Towards a sustainable recovery after Hurricane Mitch. Tegucigalpa, Honduras.

<http://www.wn.org/Mitch.pdf>

Comparison of the impact of Hurricane Mitch on two types of farm plot, conventional and ones using agroecological practices in Honduras, Nicaragua, and Guatemala. Farms using agroecological practices were more resilient to erosion and run-off.

3.3 Coastal and marine

Bann, C., 1997. An Economic Analysis of Alternative Mangrove Management Strategies in Koh Kong Province, Cambodia. Research Report, Environment and Economics Program for Southeast Asia (EEPSEA), International Development Research Centre (IDRC), Ottawa
<http://www.idrc.ca/uploads/user-S/10536114890ACF46.pdf>

This report presents an economic analysis of the different uses of the mangrove resource of Koh Kong province, Cambodia. The objective of the study is to provide information on the economic benefits and operational practices of key activities in the area that might be employed in the identification of an economically optimal management strategy for the mangrove resource. As for other mangrove areas in Cambodia, the mangroves of Koh Kong, which currently support a number of households, are threatened largely by the clearing of mangroves for intensive shrimp farms, and for commercial and domestic charcoal production. The mangroves of Koh Kong are central to the livelihood of coastal households, are of high ecological importance and represent a base for sustainable economic exploitation if carefully managed. These substantial benefits of the mangrove ecosystem will be forgone if the mangrove areas are lost or damaged through uncontrolled resource use and inappropriate development. Since local people are heavily dependent on the mangrove resource, community-based alternatives to unsustainable and destructive practices are seen as central to the success of any management strategy in Koh Kong.

Burke, L., P. Kramer, E. Green, S. Greenhalgh, H. Nobles and J. Kool. 2004. Reefs at Risk in the Caribbean. Washington, D.C.: World Resources Institute

Cesar, H. 2000. Coral Reefs: Their functions, threats and economic value. In H. Cesar (ed). Collected Essays on the Economics of Coral Reefs. Kalmar, Sweden: Kalmar University

Can be downloaded from <http://www.reefbase.org/dl.asp?type=1&record=6321>

Coral reef ecosystems provide many functions, services and goods to coastal populations, especially in the developing world. A variety of anthropogenic practices threatens reef health and therefore jeopardises the benefits flowing from these services and goods. These threats range from local pollution, sedimentation, destructive fishing practices and coral mining to global issues like coral bleaching. Economic valuation can help to shed light to the importance of the services and goods by 'getting some of the numbers on the table'. Valuation techniques are discussed and a summary of economic studies on coral reefs is presented. The concepts of Total Economic Value and Cost Benefit Analysis are used to illustrate the valuation of marine protected areas (national parks, etc.) and of threats.

Cesar, H., L. Burke and L. Pet-Soede, 2004. The Economics of Worldwide Coral Reef Degradation. Zeist: WWF Netherlands

<http://pdf.wri.org/cesardegradationreport100203.pdf>

This report attempts to assess the economic values and benefits provided by reefs. Coral reefs play a crucial role in protecting coasts from waves and storm surges, nurturing ocean fisheries, and maintaining marine biodiversity. While they make up less than 0.25 percent of the marine environment, they support more than 25 percent of all known marine fish species. The authors find that reefs could provide up to \$30 billion worth of services, from coastal protection, tourism and recreation, food from fisheries, etc. Pressures on coral reefs, however, threaten to undermine these benefits.

Chichilnisky, G. and G. Heal, 1998. Economic Returns from the Biosphere. Nature 391, pp. 629-30

Cesar, H., 1996. Economic Analysis of Indonesian Coral Reefs. Environment Department. Washington, D.C.: World Bank

Gammage, S., 1997. Estimating the Returns to Mangrove Conversion: Sustainable management or short-term gain? Paper presented at workshop on 'Mechanisms for Financing Wise Use of Wetlands', Dakar, Senegal

<http://www.iied.org/pubs/pdf/full/8092IIED.pdf>

This paper estimates the 'total economic value' of a mangrove ecosystem in part of the Gulf of Fonseca, El Salvador, and develops a cost-benefit framework to compare the sustainable management of the forest with alternative use scenarios. The research was highly participatory and involved the community in the measurement and articulation of the value of the mangroves. It is one of the first valuation exercises to incorporate a community definition of sustainable management – one which reflects the revealed preference valuations of the community and which is in harmony with their management concerns. Poverty is an important factor conditioning the use of environmental resources. Environmental products are used by the household to mitigate poverty, supplementing dietary, fuel and shelter needs. However, not all household members are equally poor, and not all household consumption decisions are motivated by 'group' needs. Anti-poverty programmes could greatly reduce dependence on the resource base. Such programmes would be more effective if strategically employed to focus those sections of the population who are more resource-dependent, or who have a particular resource dependence that disproportionately threatens the ecosystem.

Gammage, S., 1994. Estimating the Total Economic Value of a Mangrove Ecosystem in El Salvador. London: Overseas Development Administration (now DfID)

Gjertsen, H., 2005. Can Habitat Protection Lead to Improvements in Human Well-being? Evidence from Marine Protected Areas in the Philippines. World Development, Vol. 33 (2), pp. 199-217

http://aem.cornell.edu/special_programs/AFSNRM/Poverty/Papers/individual/Papers/Gjertsen.pdf

The hypothesis that sustainable resource management and biodiversity conservation can result in material benefits to participating communities is not a novel idea. Indeed, it has existed under different guises in the concepts of sustainable development, integrated conservation and development projects, sustainable use, and community-based resource management. What these approaches have in common is the belief that win-win situations between the environment and human development are possible under particular institutional arrangements. While there exists anecdotal evidence of cases in which this has been possible (as well as extensive documentation of particular successes such as CAMPFIRE), further investigation into the conditions of these successes is warranted. Disentangling the various factors that contribute to effective conservation and improved human welfare is difficult, but necessary for understanding when these win-win scenarios are likely to emerge. This paper analyses the results of a study of 42 community-based marine protected areas in the Philippines, to determine the correlates of win-win versus lose-lose or tradeoff outcomes, measured in terms of children's health and coral reef health. As a nation facing both environmental degradation and poverty, the experience of the Philippines can provide much needed insight into these critical issues.

IMM Ltd., 2002. Reef Livelihoods Assessment Project: Global overview of reef dependent livelihoods and the poor. London: DfID.

Janssen, R. and J. Padilla. 1999. Preservation or Conversion? Valuation and Evaluation of Mangrove Forest in the Philippines. Environmental and Resource Economics, Vol. 14, pp. 297-331.

<http://are.berkeley.edu/~manley/Mangroves/PhilMangroves99.pdf>

Mangrove ecosystems are rapidly declining in many parts of the world. This has resulted in the loss of important environmental and economic products and services including forest products, flood mitigation and nursery grounds for fish. The aquaculture industry was the single biggest threat to mangroves in the Philippines until 1981 when conversion of the remaining mangrove stands was prohibited by law. However, the decreasing yield from capture fisheries is putting pressure for the re-examination of this policy. To understand the importance of mangroves, insight is needed into the value of products and services provided is needed. This article compares the costs and benefits of mangrove preservation with those generated by alternative uses such as aquaculture and forestry. Equity and sustainability objectives are taken into account, in addition to economic efficiency and analyzed according to the perspectives of the different types of decision makers involved.

Ruitenbeek, J. and C. Cartier, 1999. Issues in Applied Coral Reef Biodiversity Valuation: Results from Montego Bay, Jamaica. Washington, D.C: World Bank.

Ruitenbeek, J. 1994. Modeling-economy-ecology Linkages in Mangroves: Economic evidence for promoting conservation in Bintuni Bay, Indonesia. Ecological Economics, Vol. 10, pp. 233-247.

Sathirathai, S., 1998. Economic Valuation of Mangroves and the Roles of Local Communities in the Conservation of Natural Resources: Case Study of Surat Thani, South of Thailand. Singapore: Economy and Environment Program for Southeast Asia.

Sumalde, Z.M. and S.L. Pedroso, 2001. Transaction Costs of a Community-based Coastal Resource Management Program in San Miguel Bay, Philippines. Research Report, Environment and Economics Program for Southeast Asia (EEPSEA).

Can be downloaded from http://www.idrc.ca/en/ev-8191-201-1-DO_TOPIC.html

This study estimates and analyzes the transaction costs (TC) associated with the implementation of a multilevel and multistakeholder program such as a community-based coastal resource management program. Results show that TC accounted for 37% of the total project cost (TPC). The instability of financial support resulted in high TC, which was estimated to be 86% of the TPC during the implementation phase of the coastal resource management projects. The share of the total TC was highest among the people's organizations (POs) that were the beneficiaries of the program. The number of people involved in the transactions, the number of activities undertaken, and the success index of the POs were among the factors significantly affecting the TC. Analysis also shows that while higher TC led to higher success index of the POs at the initial stage of the project implementation, an increasing level of TC eventually slowed down their performance.

Yeo, B.-H., 2002. Valuing a Marine Park in Malaysia. In D.W Pearce, C. Pearce and C. Palmer (eds). Valuing the Environment in Developing Countries: Case Studies. Cheltenham: Edward Elgar, pp. 311-326.

3.4 Land use and land degradation

Aylward, B., 2004. Land-use, Hydrological Function and Economic Valuation. In Bonnell, M. and L. A. Bruijnzeel (Eds.). Forests-Water-People in the Humid Tropics. Cambridge: Cambridge University Press.

http://guide.conservationfinance.org/download.cfm?File=18_Aylward02_Land-Use-Hydro.pdf

Land use change that accompanies economic development and population growth is intended to raise the economic productivity of land. An inevitable by product of this process is the alteration of natural vegetation and downstream hydrological function. This chapter examines the existing knowledge base with regard to the application of the tools of economic analysis to the valuation of these hydrological externalities of land use change, with an emphasis on the humid tropics.

Baland, J.-M. and J.-P. Platteau. 1996. Halting Degradation of Natural Resources: Is There a Role for Rural Communities? Rome: FAO

Bishop, J. 2002. The Economics of Soil Fertility Management: Theory and evidence from West Africa. Ph.D. Thesis. London: University of London.

Finan, F., E. Sadoulet and A. de Janvery. 2005. Measuring the poverty reduction potential of land in rural Mexico. *Journal of Development Economics*. 77: 27-51

<http://are.berkeley.edu/~finan/land.pdf>

To help inform the current debate on the role of land as an instrument for poverty reduction, we analyze the conditions under which access to land reduces poverty in Mexican rural communities. Semi-parametric regression results show that access to even a small plot of land can raise household welfare significantly. For smallholders, an additional hectare of land increases welfare on average by 1.3 times the earnings of an agricultural worker. In addition, the marginal welfare value of land depends importantly on a household's control over complementary assets such as education and on the context where assets are used such as road access.

Gisladottir, G. and M. Stocking. 2005. Land degradation control and its global environmental benefits. *Land Degradation and Development*. 16: 99-112

http://www1.uea.ac.uk/polopoly_fs/1.1060!LDD+Paper+-+Gisladottir++Stocking+Mar-05.pdf

Acknowledged by world leaders as a global problem, land degradation has been taken seriously in three ways: its extent and the proportion of the global population affected;

international environmental policy responses; and its inter-relation with other global environmental issues such as biodiversity. Messages about land degradation have, however, suffered from abuses, which have rendered appropriate policy responses ineffective. For control to be effective, the paper argues that the synergies between land degradation and the two other main global environmental change components (biodiversity and climate change) should be more fully exploited. A focus on the interlinkages, of which there are six possible permutations, is fully supported by empirical findings that suggest that land degradation control would not only technically be better served by addressing aspects of biodiversity and climate change but also that international financing mechanisms and the major donors would find this more acceptable. The DPSIR (Driving Force, Pressure, State, Impacts, Response) conceptual framework model is used to illustrate how land degradation control could be more effective, tackling not only the drivers of change but also major developmental issues such as poverty and food insecurity.

Knowler, D., 2004. The Economics of Soil Productivity: Local, national and global perspectives. Land Degradation and Development, Vol. 15, pp. 543-561

Can be purchased from <http://www3.interscience.wiley.com/cgi-bin/abstract/109855902/ABSTRACT?CRETRY=1&SRETRY=0>

Soil degradation is a mounting problem on many smallholder lands in developing countries. Economic analysis has been an important tool in addressing this problem, beginning with assessments of the financial attractiveness of investing in soil conservation works. Data compiled from 67 studies of the financial attractiveness of conservation technologies suggest that many can provide positive net returns at the farm level (64.2 per cent). While such studies have made a valuable contribution, economists have been exploring additional applications of economics to the problem, such as the development of new perspectives under the guise of ecological economics. As a result, this paper argues it is an opportune time to assess progress in the field of economic analysis of soil degradation and to consider the policy ramifications of this research. Key issues are grouped into farm-level considerations, national policy linkages and global issues. A number of policy implications emerge. Clearly, devising effective incentives at the farm or community (collective action) level must be a priority. As part of this effort, even more attention should be paid to the influence of macroeconomic and sectoral policies on soil productivity. Since soil degradation is also a problem with global ramifications, there is a clear rationale for intervention at the international level via mechanisms such as international transfers.

Lambin, E., Turner, B., Geist, H. 2001. The causes of land use and land cover change: moving beyond the myths. Global Environmental Change. 11 (4): 261-9

http://www.dpi.inpe.br/cursos/tutoriais/modelagem/referencias/lambin_LUCC_myths.pdf

Common understanding of the causes of land-use and land-cover change is dominated by simplifications which, in turn, underlie many environment-development policies. This article tracks some of the major myths on driving forces of land-cover change and proposes alternative pathways of change that are better supported by case study evidence. Cases reviewed support the conclusion that neither population nor poverty alone constitute the sole and major underlying causes of land-cover change worldwide. Rather, peoples' responses to economic opportunities, as mediated by institutional factors, drive land-cover changes. Opportunities and constraints for new land uses are created by local as well as national markets and policies. Global forces become the main determinants of land-use change, as they amplify or attenuate local factors.

Lipper, L. and D. Osgood, 2002. Two Essays on Socio-economic Aspects of Soil Degradation. Economic and Social Development Paper 149. Rome: FAO.

Pagiola, S. 1999. The Global Environmental Benefits of Land Degradation Control on Agricultural Land. Environment Paper No. 16. Washington, D.C.: World Bank

Perz, S.G., 2004. Are Agricultural Production and Forest Conservation Compatible? Agricultural diversity, agricultural incomes and primary forest cover among small farm colonists in the Amazon. World Development, Vol. 32, No. 6, pp. 957-977

http://marajo.geo.msu.edu/lba/pubs/perz_2004.pdf

This paper presents an empirical analysis that addresses recent work seeking "win-win-win" scenarios for economic development, poverty reduction and environmental sustainability. I focus on arguments for "productive conservation" in forest frontier regions, namely raising rural incomes while conserving the forest resource base. The analysis examines the impacts

of agricultural product and income diversity on agricultural incomes and primary forest cover. The findings show that net of other factors, more diversified farms have higher agricultural incomes, but not significantly less forest cover. This finding is consistent with recent work in other study sites and suggests that initiatives promoting agricultural diversity can at least partially compatibilize production and conservation.

Tiffen, M., Mortimore, M. and Gichuki, F. 1994, *More People, Less Erosion: Environmental Recovery in Kenya*, Wiley, New York and London.

UNEP 1991. *The Status of Desertification and Implementation of the United Nations Plan of Action to Combat Desertification*. Nairobi: UNEP.

3.5 Forests (timber and non-timber forest products)

Anderson, D. 1987. *The Economics of Afforestation: A Case Study in Africa*. Baltimore: Johns Hopkins University Press.

Angelsen, A. and S. Wunder. 2003. *Exploring the Forest-Poverty Link: Key Concepts, Issues and research Implications*. Occasional Paper 40. Bogor: CIFOR

Arnold, M. 2001. *Forestry, Poverty and Aid*. Occasional Paper 33. Bogor: CIFOR.

Arnold, J. and P. Bird, 1999. Forests and the Poverty-Environment Nexus. Paper prepared for the UNDP/EC Expert Workshop on Poverty and the Environment, Brussels.

http://www.prof.or.info/docs/Forests%20and%20the%20Poverty%20Nexus_Bird&Arnold_PEI.pdf

Linkages between the rural poor and the forest resources they draw upon are complex. In using and managing forests to maintain flows of material and environmental inputs into their livelihood systems, people often transform the resource. While pressures of poverty can mean that this leads to deforestation, it is incorrect to assume that this will necessarily happen. The existence of multiple categories of user, with different and often competing interests, can mean that developing equitable and effective systems of participatory control and management of forests can be difficult. In particular, the needs of the poor to have continued access to forests to sustain subsistence and coping livelihood strategies are likely to conflict with the interests of the wealthier and industry in privatising forest product flows in order to exploit market opportunities. Four main areas of recommendation are discussed in the paper. One argues for a livelihoods approach to identifying constraints faced by the poor and priorities for action. A second stresses the need to strengthen governance systems, to enable the poor who draw on forests to do so equitably within systems characterised by multiple uses and multiple stakeholders. A third focuses on bringing about necessary policy reforms to underpin more equitable and sustainable forest use and management, and on strengthening mechanisms to implement and enforce such reforms. The fourth emphasises the importance of promoting partnerships among those with interests in sustainable forest management, at both the policy and local governance levels, in order to advance such changes.

Arnold, M. and I. Townson, 1998. Assessing the Potential of Forest Product Activities to Contribute to Rural Incomes in Africa. ODI Natural Resource Perspectives Number 37, Overseas Development Institute, London.

<http://www.odi.org.uk/fpeg/publications/policybriefs/nrp/nrp-37.pdf>

Large numbers of rural households in Africa continue to generate some of their income from forest product activities. However, much of this involvement is in labour intensive low return activities that help to provide the poor with an income safety net, but which decline once better alternatives become available. Expansion of forest product activities is likely to be concentrated on a limited number of products and services for which demand grows with rural and urban development. The paper reviews the implications of this dichotomy for support and resource management strategies. It finds that intervention strategies need to recognise the distinction between those who are engaged in forest product activities because they lack alternative means of sustenance, and those who are responding to market opportunities. It may be more fruitful to help people engaged in activities with declining prospects to move into other more rewarding fields of endeavour, rather than seeking to raise their productivity in their current line of work. Support to sustainable types of activity needs to be geared to meet the

different needs of those at different points in the enterprise development process (start-up, expansion from a small beginning, further upgrading, etc.). Management of the resource needs to take account of the declining prospects for some of the presently more important products, the likely concentration of demand on a limited number of products of growing commercial value, and the need often to maintain forest resources for their 'buffer' role in times of hardship. And finally, where reliance on forest products is likely to decline, care needs to be taken not to commit communities to institutional arrangements that they are unlikely to be able to sustain once forest products are less important in their livelihoods.

Bahuguna, V. 2000. Forests in the Economy of the Rural Poor: An estimation of the dependency level. *Ambio*, 29, 3, May, 126-129.

Bann, C., 1997. An Economic Analysis of Tropical Forest Land Use Options, Ratanakiri Province, Cambodia. Research Report, Environment and Economics Program for Southeast Asia (EEPSEA), International Development Research Centre (IDRC), Ottawa.

<http://www.idrc.ca/uploads/user-S/10536114500ACF4B.pdf>

Forestland in Ratanakiri represents an extremely valuable natural resource that needs to be correctly managed if its benefits are to be maximised. Despite the lack of a land use plan for the province, a number of commercial development activities are underway. Many of these options will result in the destruction of pristine forest areas. Because local communities in Ratanakiri are totally dependent on the forest and the rapid rate of deforestation is evident throughout Cambodia, sustainable forest management options urgently need to be identified for the area. This study compares two key land uses—the value of using the forest land for traditional purposes (such as the harvesting of NTFP) against its use for commercial timber extraction. Forest products have always been assumed to have zero value. This study proves the assumption wrong. Results show that in Ratanakiri, forest products have a value that may be as high as US\$3,922 per hectare of forest. If this forest were to be harvested for timber, it would have a value of less than this; no more than US\$1,697 per hectare. The results show that the benefits from traditional sustainable use of forest resources exceed the benefits of commercial timber extraction in the study area by at least US\$200 per hectare (NPV over a 90-year period). When one considers the other environmental functions that would be lost from timber harvesting (e.g., loss of significant watershed functions and biodiversity values) then the net benefits from harvesting timber are diminished further. Furthermore, the rich cultural heritage of the many ethnic minorities of Ratanakiri is intricately based on the forest. This suggests that areas of high cultural value and environmental significance might best be managed by local communities.

Barbier, E. 1992. Rehabilitating gum arabic systems in Sudan: economic and environmental implications. *Environmental and Resource Economics*. 2:341-352.

Belcher, B., M. Ruiz-Perez and R. Achdiawan, 2005. Global Patterns and Trends in NTFP Development. Paper presented at The International Conference on Rural Livelihoods, Forests and Biodiversity, Center for International Forestry Research (CIFOR), Bogor.

http://www.cifor.cgiar.org/publications/corporate/cd-roms/bonn-proc/pdfs/papers/T2_FINAL_Belcher.pdf

Understanding of the role and potential of NTFPs in livelihood strategies has been hindered by a lack of a clear theoretical framework and a functional typology of cases and the conditions that characterize each of the groups. To help fill this gap, the authors undertook a large comparative analysis of cases of NTFP commercialization. The comparison included a total of 61 cases from Africa, Asia and Latin America. The cases were selected to represent a range of kinds of products (animals, plants, plant products, fungi), of production systems (from pure extractive to cultivated) and market systems (from local markets to export markets). The authors found a strong relationship between the NTFP contribution to household income and the integration of households into the cash economy. However, NTFP producers tend to be poorer than their neighbours. Even commercial NTFP producers tend to be poor or very poor relative to national averages. Integrated conservation and development projects (ICDPs) and focused NTFP projects have attempted to improve NTFP production or processing technology, to develop markets, or to support improved management through improved institutions, with the objective of increasing the creation and capture of NTFP-based value by the intended beneficiaries. However, NTFPs in these cases do not always offer the best opportunities either for livelihood improvement or for encouraging conservation. Even with commercial NTFP production, these households remain poor. Among other factors, wealthier people are generally better placed to take advantage of new market opportunities, having land

and/or capital, as well as better skills and connections. It is simplistic, and often wrong, to assume that because an NTFP is important to the poor, efforts to develop it will help the poor. Ultimately, if NTFPs are to be useful in efforts to reduce poverty – that is, to lift people of poverty – it will have to be through increased and/or more efficient commercial production and trade.

Berck, P., C. Costello, L. Fortmann and S. Hoffman, 2000, Poverty and Employment in Timber-Dependent Countries. Discussion Paper 00–52, Resources for the Future, Washington DC.

<http://www.rff.org/Documents/RFF-DP-00-52.pdf>

One of the most controversial aspects of federal and state policies aimed at protecting old-growth ecosystems has been the potential impact of job losses on local economies. A fundamental question for historically timber-dependent communities is whether these policies will result in local economic stagnation and enduring pockets of poverty. In this paper, we examine the long-run impact of changes in timber-related employment on other types of employment and participation in major federal poverty programs. We use monthly, multi-county time series data to estimate a vector autoregressive model of the experience of northern California counties during the 1980s and 1990s. We find that employment base multiplier effects of timber employment on other types of employment in each county are small, and state economic conditions rather than local employment conditions are the principal driver behind local poverty.

Brown, D. K. Schreckenbach, G. Shepherd and A. Adrian, 2002. Forestry as an Entry Point for Governance Reform. ODI Forestry Briefing, Overseas Development Institute, London.

<http://www.odi.org.uk/fpeg/publications/policybriefs/forestrybriefings/forestrybriefing-01.pdf>

Tropical forestry provides a useful entry point for governance programmes. The very factors which make it a challenging sector for development assistance commend it also as a crucible for governance reform: its inclusive focus, linking the global to the national and local; the high levels of income and other benefits which it generates; its local fiscal base; the centrality of issues of tenure and collective rights; and its importance in rural livelihoods, all reinforce the linkages between good governance, public accountability and poverty alleviation. Ensuring that the forest sector fulfils this brief is a major challenge not just to host country governments but also to the donor community. The authors suggest that progress in the forest sector can secure wider gains in governance. Tropical forestry's experience shows that a combination of pressures – both 'bottom up' and 'top down' – may be needed to build public accountability. Also the transfer of rights over resources is important for turning 'participation' into citizenship. Forestry's local fiscal base can strengthen decentralised government, and contribute significantly to poverty alleviation. Forestry offers experience with a wide variety of pro-poor growth strategies, and the legal, institutional and policy reforms necessary to secure these. Pro-poor regulatory reform can be a challenging task, combining de-regulation with new and additional safeguards to meet multiple goals. Important questions need to be asked about the governance implications of internationally-funded initiatives, particularly in the area of conservation.

Chomitz, K. and K. Kumari. The domestic benefits of tropical forests: a critical review. The World Bank Research Observer. 13(1): 13-35

Cruz, W., H. Francisco and G. Amacher. 1995. Poverty, Migration and Deforestation in the Philippines. Washington, D.C.: World Bank, Mimeo

Deining, K. and Minten, B. 1999. Poverty, policies and deforestation: the case of Mexico. Economic Development and Cultural Change. 47 (2): 313-344

Duong, N. J. Morris, L. Phi, and J. Raintree, 2003. Domesticated NTFPs, Secured Livelihoods: Impacts of NTFP domestication and agro-forestry on poverty alleviation and livelihood improvement. A case study for Vietnam. Paper prepared for IUCN's 3I-C Project on Poverty Alleviation, Livelihood Improvement and Eco-system Management. IUCN – The World Conservation Union, Hanoi

http://www.iucn.org/themes/fcp/publications/files/3ic_cs_vietnam.pdf

This is a case study of the NAFRI-IUCN NTFP Project in Lao PDR (1995- 2001). It focuses on sustainable harvesting regimes for bitter bamboo shoots and wild cardamom in one poor village in the northern mountainous province of Oudomxay. The sustainable harvesting regime for bitter bamboo in Oudomxay generated the most impressive results on poverty alleviation and livelihood development in the NTFP Project and continues to be a shining example in Lao

PDR. The report tried to translate these results into economic values through cost-benefit analyses and describe their impacts on local livelihoods and eco-systems through the voices of local people, local leaders and relevant organizations at district, provincial and national levels. The case study showed that the sustainable harvesting regimes played a major role in reducing poverty and sustaining local livelihoods, while providing villagers with enduring incentives and adequate capacities to manage village forests. The achievements were also remarkable for their equitable distribution among villagers, capacity to reach the poorest households, and the interest that they raised in NTFP among development and conservation organizations.

Dürr, C. 2004. The Contribution of Forests and Trees to Poverty Alleviation. Series IC No 3, Intercooperation, Swiss Organisation for Development, and Cooperation, Bern
<http://www.intercooperation.ch/offers/download/s-ic-3-duerr-forestry-poverty-eng.pdf>

It is the objective of this paper to stimulate discussion about questions related to the globally relevant topic of forests and poverty. Forests make an important contribution to the quality of life for all human beings. For many poor families in the East and South, meanwhile, the use of forest resources is a crucial means to survival and the focus of their lives. Forests provide the basic ingredients for their meals, help them generate additional income and serve as indispensable emergency reserves. Whereas many of us think of forest products mainly in terms of timber, for the poor, firewood, non-wood products and non-material environmental functions are of much higher relevance. This paper demonstrates that a fair access of the poor to these resources is subject to political and social changes.

Emerton, L., 2005. Making the Economic Links Between Biodiversity and Poverty Reduction: The case of Lao PDR. IUCN — The World Conservation Union, Ecosystems and Livelihoods Group Asia, Colombo

This paper provides concrete examples of the linkages between biodiversity, poverty reduction and socio-economic development in Nam Et Phou Louei forest (NEPL) Lao PDR. It articulates the economic contribution that biodiversity makes to local livelihoods and national development indicators, and in particular underlines its value for the poorest and most vulnerable groups in the country. The paper describes how, over the last decade, both domestic and overseas funding to biodiversity has declined dramatically in Lao PDR. At the same time, many of the policy instruments that are being used in the name of promoting development have acted to make conservation financially unprofitable and economically undesirable. The case of Lao PDR illustrates a situation, and highlights an apparent paradox, that is also found in many other parts of the world. If biodiversity has such a demonstrably high economic and livelihood value, especially for the poorest, then why is it persistently marginalised by the very economic policies and funding flows that are tied to strengthening livelihoods, reducing poverty and achieving sustainable socio-economic development? For development financing to be truly pro-poor, it must incorporate biodiversity considerations, which are necessary for both short-term and long-term economic growth and poverty reduction.

Fisher, M. 2004. Household welfare and forest dependence in Southern Malawi. *Environment and Development Economics*. 9: 135-154

Geisler, C. 2003. A new kind of trouble: evictions in Eden. *International Social Science Journal*. 55 (175): 69-78

Geist, H. and Lambin, E. 2001. What Drives Tropical Deforestation? A Meta-analysis of Proximate and Underlying Causes of Deforestation Based on Subnational Case Study Experience. LUCR Report Series No. 4, Department of Geography, University of Louvain. Louvain-la-Neuve: University of Louvain

Grimes, A., Loomis, S., Jahnige, P., Burnham, M., Onthank, K., Alarcón, R., Cuenca, W. P., Martinez, C. C., Neill, D., Balick, M., Bennett, B., Mendelsohn, R. 1994, Valuing the rain forest: The economic value of non-timber forest products in Ecuador, *Ambio*. 23 (7)

Howard, A. and Valerio, J. 1996. Financial returns from sustainable forest management and selected agricultural land-use options in Costa Rica. *Forest Ecology and Management*. 81: 35-49

Morris, J., Hicks, E., Ingles, AW, Ketphanh, S, 2004. Linking Poverty Reduction. with Forest Conservation. Case Studies from Lao PDR. Paper prepared for IUCN's 3I-C Project on Poverty

Alleviation, Livelihood Improvement and Eco-system Management. IUCN – The World Conservation Union, Bangkok

<http://www.iucn.org/themes/fcp/publications/files/poverty/lao-pdr-povertyreductionbook.pdf>

Over 80 percent of the population of Lao PDR is engaged in agriculture (primarily rice cultivation for subsistence consumption), and is thus directly dependent on the natural resource base; it is estimated that nearly half of all the farming households in the country - 3 300,000 households - continue to practise slash and burn cultivation. Similarly, recent studies have shown that rural villagers derive nearly half their income from the sale of NTFPs, including rattan, bamboo and yang-tree oil. NTFPs also play a vital role in food security, particularly at the end of the dry season and during times of harvest failure. In total, local subsistence use of NTFPs may account for 20 to 30 percent of the Gross National Product of Lao PDR. Rural dependence on forest resources for both household consumption and income remains high; this is primarily due to poverty and the generally low level of development. Lao PDR's forests are one of few potential sources of sustainable economic growth for the country. The relatively large amount of remaining forest resources and the high level of forest dependence by local communities, coupled with the extent of rural poverty in Lao PDR, presents unique opportunities and challenges to combine forestry with poverty alleviation approaches to help meet national development goals. Some examples are explored which illustrate the interactions between previous and existing policies and programmes for forest conservation and poverty reduction in Lao PDR, as well as their effects on the ground include, land-forest allocation, logging, community forestry and non-timber forest products.

IUCN, 2003. Sekong Province, Lao PDR: Economic returns from conserving natural forests. Case Studies in Wetland Valuation #8, IUCN – The World Conservation Union, Asia Ecosystems and Livelihoods Group, Colombo

<http://www.waterandnature.org/econ/CaseStudy08sekong.pdf>

Among countries in Asia, Lao PDR is noted for its high forest cover (> 50%). However, this figure is steadily decreasing at an average rate of 100,000-200,000 hectares per year. A major reason is that decision makers heavily undervalue the forest as a resource. The forest is mostly perceived in terms of its commercial value, not its importance for biodiversity and local livelihoods. To inform this debate, and to demonstrate the links between biodiversity and current sectoral priorities and development needs in Lao PDR, IUCN and WWF jointly carried out a study to calculate the economic returns from conserving forests in Sekong Province. The main objective of this study was to influence development and economic sectors to integrate biodiversity concerns into their policies, plans, and budgets by highlighting the economic value of maintaining natural regeneration forests. The forests of Sekong Province offer a wide range of economic and financial values that prove to be substantial and numerous. Estimates of direct use values show that the estimated annual value of NTFPs is between US\$ 398 to 525 per household, figures which are way above the provincial average income of US\$ 120. Natural forest resources are essential for the economic survival and livelihood security of the poorest households. Forest products contribute a much higher proportion of total household income to the poorest. As households veer away from poverty though, the relative contribution of NTFPs towards their livelihoods decline.

Kaimowitz, D. and Angelsen, A. 1998. Economic Models of Deforestation: a Review. Bogor, Indonesia: CIFOR

Kaimowitz, D., 2003. Forests and Rural Livelihoods in Developing Countries. Center for International Forestry Research (CIFOR), Bogor

Hundreds of millions of people in the developing world rely heavily on forests for a significant portion of their livelihoods. National poverty reduction strategies and government policies often fail to fully recognize that. Many policymakers still think of “forests” as an environmental issue and of “forestry” only in relation to national economic growth, without recognizing the forests’ crucial role in rural livelihoods. In other cases, policymakers are aware that forests are important for livelihoods but don’t believe that much needs to or can be done from a policy perspective. That is not true. Governments and non-governmental organizations can do a lot to help poor rural households obtain and retain access to forest resources, create new resources, and earn greater incomes from the resources they have. This paper summarizes the evidence on how forests contribute directly and indirectly to rural livelihoods in developing countries. To the extent possible it gives figures about how large those contributions are, although those figures are generally little more than “guesstimates”. The paper also discusses some threats to forests’ contributions and opportunities for enhancing them. Finally, it

recommends steps governments and nongovernmental organizations might take to incorporate forests into their poverty reduction strategies.

Karanja, F., H. Mogaka, G. Simons, J. Turpie. and L. Emerton, 2001. Economic Aspects of Community Involvement in Sustainable Forest Management in Eastern and Southern Africa. IUCN — The World Conservation Union, Eastern Africa Programme Forest and Social Perspectives in Conservation No 8, Nairobi

<http://www.biodiv.org/doc/case-studies/inc/cs-inc-iucn-03-en.pdf>

This study investigates the extent to which communities have been provided with economic incentives to become involved in sustainable forest management in Eastern and Southern Africa. It finds that if poor communities are to be willing, and economically able, to involve themselves in sustainable forest management they must receive greater economic benefits from conserving forests than from degrading them. There is generally little recognition by either economic or forest sector decision-makers and planners of the high economic value of forest resources for poor communities. In many cases, development and economic policies in Eastern and Southern Africa have actually provided economic disincentives to communities in sustainable forest management. National forest policies have moved away from a focus on strict protection and commercial production to approaches geared towards using forest resources in pursuit of sustainable development and poverty alleviation goals, and to the economic benefit of local communities. Despite a much greater emphasis on “community-based” approaches to forest management, there are few instances where this has actually managed to counterbalance the local-level opportunity costs associated with forests or to generate substantive economic benefits of a sufficient quality or quantity to compete on economic terms with the unsustainable use of forest land and resources.

Kishor, N. and Constantino, L. 1993. Forest management and Competing Land Uses: an Economic Analysis for Costa Rica, LATEN Dissemination Note 7, Washington, D.C.: World Bank

Koop, G. and L. Tole. 1999. Is there an environmental Kuznets curve for deforestation? Journal of Development Economics. 58: 231-244

Kumar, N., N. Saxena, Y. Alagh and K. Mitra, 2000. India: Alleviating Poverty through Forest Development. Evaluation Country Case Study Series, Operation Evaluation Department, The World Bank, Washington, D.C.

[http://wbIn0018.worldbank.org/oed/oeddoclib.nsf/22bf4582b112ac8585256808006a0026/c14758e94c1f79e985256970007b95b1/\\$FILE/India.pdf](http://wbIn0018.worldbank.org/oed/oeddoclib.nsf/22bf4582b112ac8585256808006a0026/c14758e94c1f79e985256970007b95b1/$FILE/India.pdf)

This case study is an evaluation of the implementation of the World Bank's 1991 Forest Strategy in India. It examines the overall development of the country's forest sector. While this naturally includes environmental impacts on forests, such as degradation, biodiversity loss, and deforestation, it also encompasses the economic uses of forests, including the management of forest resources for production, the role of forest development in poverty alleviation, and the impacts of forest research and development. Bank lending to India has been relevant in the past and can contribute significantly to forest sector development and poverty alleviation in the future.

Kumari, K. 1996. Sustainable forest management: myth or reality? Exploring the prospects for Malaysia. *Ambio*. 25 (7): 459-467

Matthews, E. 2001. Understanding the Forest Resources Assessment 2000. Washington, D.C.: World Resources Institute

Morris, J. and A. Ingles, 2003. Assessing the “Enabling Environment” in Vietnam for Linking Forest Conservation with Poverty Reduction - A policy analysis for Vietnam. Paper prepared for IUCN's 3I-C Project on Poverty Alleviation, Livelihood Improvement and Eco-system Management. IUCN – The World Conservation Union, Hanoi

http://www.iucn.org/themes/fcp/publications/files/3ic_pa_vietnam.pdf

The Government of Vietnam has placed poverty reduction and forest conservation among its top priorities. Despite ambitious aims, actual integrated solutions are still difficult. A major challenge struggle in the forestry sector in Vietnam, common to many areas in the world, is that poor and ethnic minority communities are typically excluded from and/or negatively impacted by timber harvesting and commercialized NTFP extraction. Or, conversely, conservation initiatives end up prohibiting poor and ethnic minority communities from using forests, despite their dependence on them for basic livelihoods and, in some cases, long

standing use of such forests. Reforestation programs can have the same effect when they plant on areas important for agriculture, crop rotation cycles and NTFP collection. In some cases, land concessions for forest protection contracts or NTFP extraction have been granted to private owners for forests that are already being used by various communities without official tenure rights.

Morris, J and S Ketphanh, 2003. Bitter Bamboo and Sweet Living: Impacts of NTFP conservation activities on poverty alleviation and sustainable livelihoods. A case study for Lao PDR. Paper prepared for IUCN's 3I-C Project on Poverty Alleviation, Livelihood Improvement and Eco-system Management. IUCN – The World Conservation Union, Gland
http://www.iucn.org/themes/fcp/publications/files/3ic_cs_lao.pdf

This case study on the NAFRI-IUCN NTFP Project in Lao PDR (1995- 2001) focuses on sustainable harvesting regimes for bitter bamboo shoots and wild cardamom in one poor village in the northern mountainous province of Oudomxay. The sustainable harvesting regime for bitter bamboo in Oudomxay generated the most impressive results on poverty alleviation and livelihood development in the NTFP Project and continues to be a shining example in Lao PDR. The current case study has tried to translate these results into economic values through cost-benefit analyses and describe their impacts on local livelihoods and eco-systems through the voices of local people, local leaders and relevant organizations at district, provincial and national levels. The case study showed that the sustainable harvesting regimes played a major role in reducing poverty and sustaining local livelihoods, while providing villagers with enduring incentives and adequate capacities to manage village forests. The achievements were also remarkable for their equitable distribution among villagers, capacity to reach the poorest households, and the interest that they raised in NTFP among development and conservation organizations.

Newcombe, K. 1989. An economic justification for rural afforestation: the case of Ethiopia, in G. Schramm and J. Warford (eds), *Environmental Management and Economic Development*, Baltimore: Johns Hopkins University Press, 117-138

Pagiola, S., J. Bishop and N Landell-Mills. 2002. *Selling Forest Environmental Services: Market-based Mechanisms for Conservation and Development*. London: Earthscan

Pattanayak, S. and E. Sills, 2001. Do Tropical Forests Provide Natural Insurance? The Microeconomics of Non-Timber Forest Product Collection in the Brazilian Amazon. *Land Economics* November 2001 77 (4): 595-612

Can be purchased from:

<http://www.ingentaconnect.com/content/wisc/lec/2001/00000077/00000004/art00010;jsessionid=4i582gewafqj.alice>

Tropical forests may contribute to the well-being of local people by providing a form of natural insurance. The authors draw on microeconomic theory to conceptualize a model relating agricultural risks to collection of non-timber forest products. Forest collection trips are positively correlated with both agricultural shocks and expected agricultural risks in an event-count model of survey data from the Brazilian Amazon. This suggests that households rely on forests and the diversity they contain to mitigate agricultural risk, as natural insurance. Forest product collection may be less important to households with other consumption-smoothing options, but its importance is not restricted to the poorest households. We expected wealthier households to take fewer trips, but found that the effect depends on the category of wealth. Livestock has the expected negative effect, but the count of possessions has a positive effect. Forest collection is positively correlated with both agricultural shortfalls (consumption smoothing response) and expected agricultural risks (income smoothing response). This indicates that households rely on the forest to mitigate the risk inherent to subsistence agriculture.

Pearce, D. W. 2003. The economic value of forest ecosystems, *Ecosystem Health*. 7 (4) December: 284-296

<http://www.blackwell-synergy.com/links/doi/10.1046/j.1526-0992.2001.01037.x/abs/>

Forest ecosystems are being degraded and lost because of rapid population change and economic incentives that make forest conversion appear more profitable than forest conservation. All ecological functions of forests are also economic functions. Many important forest functions have no markets, and hence, no apparent economic value, justifying the use of forest land for other purposes. Imputing economic values to nonmarketed benefits has the potential to change radically the way we look at all forests and to make the pendulum swing

back from a presumption in favor of forest conversion to more conservation and sustainable use. This paper surveys what we know about forest economic values and draws policy conclusions from the now substantial literature that values nonmarket benefits of forests. Estimating economic values is not enough. The subsequent stage of policy is to design markets that capture the values—'market creation'—ideally for the benefit of the many vulnerable communities that rely on the forests for their well-being. These conclusions support the wider argument for using effective economic instruments to promote conservation of the remaining forests. Forest loss involves: risks to human health; accelerated climate change; increased watershed disruption, adding to eutrophication in inland and coastal waters; loss of water quality; and loss of biodiversity.

Pearce, D. W and C. Pearce. 2001. *The Value of Forest Ecosystems*, Montreal: Convention on Biological Diversity

Can be downloaded from www.biodiv.org/doc/publications/cbd-ts-04.pdf

Pearce, D. W and S Mourato. 2004. The economic valuation of agroforestry's environmental services. In G. Schroth, G Fonseca, C. Harvey, C Gascon and H. Vasconcelos (eds), *Agroforestry and Biodiversity Conservation in Tropical Landscapes*. Washington, D.C.: Island Press: 67-86

Pearce, D.W., F. Putz and J. Vanclay. 1999. *A Sustainable Forest Future?* London: Natural Resources International, UK and UK Department for International Development

Pearce, D.W., F. Putz and J. Vanclay . 2002a. Sustainable forestry in the tropics: panacea or folly? *Forest Ecology and Management*, 5839: 1-19

Pearce, D.W., F. Putz and J. Vanclay. 2002b. Is sustainable forestry economically possible? In D W Pearce, C. Pearce and C Palmer (eds), *Valuing the Environment in Developing Countries: Case Studies*. Cheltenham: Edward Elgar: 447-500

Rice, R., R. Gullison and J. Reid, 1997. Can Sustainable Management Save Tropical Forests? *Scientific American*. Vol. 276, pp. 34-39.

Ricker, M., R. Mendelsohn, D. Daly and G. Angeles. 1999. Enriching the rainforest with native fruit trees: an ecological and economic analysis in Los Tuxtlas (Veracruz, Mexico). *Ecological Economics*. 31 (3): 439-448

Ricketts, T.H., G.C. Daily, P.R. Ehrlich and C.D. Michener, 2004. Economic Value of Tropical Forest to Coffee Production. *Proceedings of the National Academy of Science*, 101(34), pp.12579-12582.

Rozelle, S., J. Huang, S. Husain and A. Zazueta, 2000. China: From Afforestation to Poverty Alleviation and Natural Forest Management. Evaluation Country Case Study Series, Operation Evaluation Department, The World Bank, Washington, D.C.

[http://wbi0018.worldbank.org/oed/oeddoclib.nsf/0/3789e9ebf06dd73d852569700079e223/\\$FILE/ChinaCS.pdf](http://wbi0018.worldbank.org/oed/oeddoclib.nsf/0/3789e9ebf06dd73d852569700079e223/$FILE/ChinaCS.pdf)

This case study is an evaluation of the implementation of the World Bank's 1991 Forest Strategy in China. It examines the overall development of the country's forest sector, from aggressive reforestation and afforestation in the 1980s to recent efforts which involving a strategy that embraces a wide range of development goals, including poverty alleviation and biodiversity protection. While this naturally includes environmental impacts on forests, such as degradation, biodiversity loss, and deforestation, it also encompasses the economic uses of forests, including the management of forest resources for production, the role of forest development in poverty alleviation, and the impacts of forest research and development. As China shifts from IDA lending to IBRD, the lending program in the forest sector is coming under pressure at the same time that China's economy has been slowing, and the ability of poor households to borrow for long-term forest investments at commercial interest rates is in question. Unfortunately, it is unclear from project documents if the current strategy to support forest sector projects, watershed development, and plantation expansion is going to have a large effect on poverty and a positive effect on the environment. The Bank has tended to finance projects with nationwide coverage that are administered very effectively by provinces and counties, albeit with national-level coordination. But the Ford Foundation and WWF, believe that community participation and social forestry require a more localized approach for effecting long-term rural development in many of China's poorest, most remote areas.

Sander, K. and M. Zeller. 2004. Forest Resource Management between Conservation and Poverty Alleviation – Experiences from Madagascar. Institute of Rural Development. Göttingen: University of Göttingen. Mimeo

Shanley, P. and L. Luz, 2003. The Impacts of Forest Degradation on Medicinal Plant Use and Implications for Health Care in Eastern Amazonia. *BioScience*, Vol. 53 No. 6, pp. 573-584

Takashi, Y., B. Barham and O. Coomes. 2004. Risk coping strategies in tropical forests: floods, illnesses and resource extraction. *Environment and Development Economics*. 9: 203-224

Vedeld, P., A. Angelsen, E. Sjaasrad and G. Berg. 2004. Counting on the Environment: Forest Income and the Rural Poor. Environmental Economics Series No. 98. Washington, D.C.: World Bank

<http://www->

wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2004/09/30/000090341_20040930105923/Rendered/PDF/300260PAPER0Counting0on0ENV0EDP0198.pdf

Environmental income is defined as rent (or value added) captured through consumption, barter, or sale of natural capital within the first link in a market chain, starting from the point at which the natural capital is extracted or appropriated. Although there are substantial variations in methodology and quality of the 54 case studies analysed, results indicate that forest environmental income represents a significant income source with an average contribution to household income of some 22 percent in the populations sampled. The main sources of forest environmental incomes are fuelwood, wild foods, and fodder for animals. Forest environmental income has a strong and significant equalizing effect on local income distribution. Cash income constitutes about half of total forest environmental income. The report recommends the development of research protocols, field methods, and simple analytical models to analyze the role of environmental income in rural livelihoods. More in-depth studies are needed to unravel the roles of local heterogeneity and social differentiation. Extended studies that generate time series data would assist in understanding the role of environmental income in both individual household strategies and in broader development strategies. The omission of forest environmental income in national statistics and in poverty assessments leads to an underestimation of rural incomes, and a lack of appreciation of the value of environment. In areas where environmental income is important, this omission may also lead to flawed policies and interventions.

Wunder, S. 2001. Poverty alleviation and tropical forests – what scope for synergies? *World Development*. 29 (11):1817-1833

Xu, Z., M.T. Bennett, R. Tao and J. Xu, 2004. China's Sloping Land Conversion Programme Four Years On: Current situation and pending issues. *International Forestry Review* Vol. 6(3-4)

3.6 Wetlands and water

Ayoo, C. 1998. A Cost-Benefit Analysis of Alternative Wetland Uses in Kenya: The Case of Yala Swamp. Paper 1998:1. Unit for Environmental Economics. Gothenburg: Gothenburg University

Bae, J.-H. 2002. Wetland Conversion in South Korea: The Economics and Political Economy of Saemangeum Tidal flats. M.Sc Thesis. London: University College London

Barbier, E. and J. Thompson. 1998. The value of water: Floodplain versus large-scale irrigation benefits in Northern Nigeria. *Ambio*. 27(6): 434-440

Boserup, E, 1980. *Population and Technological Change*. Chicago: University of Chicago Press

Brander, L.M., J.G.M. Florax and J.E. Vermaat, 2003. The Empirics of Wetland Valuation: A Comprehensive Summary and a Meta-Analysis of the Literature. Amsterdam: Vrije Universiteit

<http://eaere2004.bkae.hu/download/paper/branderpaper.pdf>

Wetlands are highly productive ecosystems, providing a number of functions (products and services) that are of value to people. The open-access nature and the public-good characteristics of wetlands often result in wetlands being undervalued in decisions relating to their use and conservation. There is now a substantial literature on wetland valuation,

including two meta-analyses. These meta-analyses examine subsets of the available wetland valuation literature, focusing on temperate wetlands, a limited set of wetland functions, and a limited set of valuation techniques. We collect over 190 wetland valuation studies, providing 215 value observations, in order to present a more comprehensive meta-analysis of the valuation literature that includes tropical wetlands (e.g., mangroves), estimates from diverse valuation methodologies, and a broader range of wetland functions (e.g., biodiversity value). We also aim for a more comprehensive geographical coverage. We find that socioeconomic variables, such as income and population density, that are often omitted from such analyses are important in explaining wetland value. We also assess the prospects for using this analysis for out of sample value transfer, and find average transfer errors of 74%, with just under one-fifth of the transfers showing errors of 10% or less. This overall performance is, however, dominated to a considerable extent by transfer to small sites. The performance of value transfer for medium to large wetlands on average shows transfer errors smaller than 30%.

Briscoe, J. 1997. Managing water as an economic good: rules for reformers. *Water Supply*. 15 (4):153-172

Brouwer, R., I. Langford, I. Bateman and R. Turner. 2003. A meta-analysis of wetland ecosystem valuation studies. In R. Turner, J. van den Bergh and R. Brouwer (eds.). 2003. *Managing Wetlands: An Ecological Economics Approach*. Cheltenham: Edward Elgar. 108-129

De Koning, F., R. Olschewski, E. Veldkamp, P.C. Benítez, P. Laclau, M. López, M. De Urquiza and T.Schlichter, 2002. Evaluation of the CO₂ Sequestration Potential of Afforestation Projects and Secondary Forests in Two Different Climatic Zones of South America. TOEB publication number: TWF-37e. Eschborn: German Agency for Technical Cooperation (GTZ)

Emerton, L., L. Iyango, P. Luwum and A. Malinga. 1999. The Economic Value of Nakivubo Urban Wetland. Nairobi: WCU. Summarized in IUCN 2003. *Case Studies in Wetland Valuation No. 7*. Gland: IUCN

Ghosh, S.K., undated. Poverty Elevation through Traditional Commercial Practices in the Wetlands of Eastern India: Lesson for the poorer countries with suitable hydrological regimes

Abstract available at: http://www.bio.uu.nl/intecol/programme/cnt_abstract.php?frm=T5_cs21_13.pdf

Traditional commercial practices in wetlands is not always ecologically beneficial, still these age-old practices are possibly the best option for conservation and management of wetlands in the tropical economically handicapped countries due to lack of suitable alternatives. From a thorough decade long survey in the 18 districts of West Bengal (India), it is concluded that at least 1-3% of its population still depend on management and cultivation of aquatic and wetland plants. All these species are grown in natural or nearly natural habitats without any hi-tech interference and are of direct values to humans and many other plants and animals, particularly birds. Traditional practices based on wetland plants have been estimated, quantified and mapped in West Bengal. A five-member family can earn INR1500 (>30\$) by managing a wetland area of 2000 sq ft with cultivation of *Cyperus pangorei* (mat plant). More than 20, 000 rural people meet their subsistence livelihood support from cultivation and management of *Typha elephantina*. About 87,000 ha wetland areas collectively in the North Bihar and West Bengal presently managed for makhana or fox nut (*Euryale ferox*) cultivation. An unemployed youth can earn about 100 US\$ per month by selling handicrafts prepared from soft stem pith of *Aeschynomene aspera*. Export values of these products is 5-10 greater.

Hammitt, J., J-T Liu and J-L Liu. 2001. Contingent valuation of a Taiwanese wetland. *Environment and Resource Economics*. 6: 259-268

IUCN, 2003. Barotse Floodplain, Zambia: Local economic dependence on wetland resources. Case Studies in Wetland Valuation #2. IUCN – The World Conservation Union, Asia Ecosystems and Livelihoods Group, Colombo

<http://www.waterandnature.org/econ/CaseStudy02barotse.pdf>

This case study describes an attempt to assess the value of local level wetland resource use by wetland communities as the ecological and economic value of wetlands to rural communities is not fully appreciated when river basin planning and management is undertaken, thereby often interfering with wetlands of local economic importance and impacting heavily on the communities who live beside them. A dynamic model that calculates the present net value of wetland resources under different future management scenarios

confirmed the extremely high value of wetland resource use in local livelihoods, and as a way of spreading seasonal risk and uncertainty. In total, local use of wetland resources in the Barotse Floodplain was found to have a net economic value of some \$8.64 million a year. At the household level, wetlands were calculated to generate an average net financial return of \$405 a year. The major proportion, 83%, of this value was comprised of subsistence values and home consumption. Not only is the value of the wetland great in absolute terms, but it also forms a key component of local livelihoods – without access to wetland resources, households would both lose the values accruing from natural resource use and their essential source of support. Dynamic modelling indicated that the most economically valuable future management option was wise use of the wetland area, possibly combined with small areas under strict protection.

IUCN, 2003. Waza Logone Floodplain, Cameroon: Economic benefits of wetland restoration. Case Studies in Wetland Valuation #4. IUCN – The World Conservation Union, Asia Ecosystems and Livelihoods Group, Colombo

<http://www.waterandnature.org/econ/CaseStudy04Waza.pdf>

This case study describes an exercise that was undertaken to assess the economic effects of floodplain degradation in the Waza Logone region, a semi-arid ecosystem in northern Cameroon that has been severely impacted by upstream water diversion for irrigation. A large amount of donor and government funding has recently been made available for projects to address poverty alleviation concerns in Cameroon. To date, proposals have been focused mainly on the provision of basic services, infrastructure and income-generating activities for the urban and rural poor, rather than on environmental conservation and restoration activities. The results of the valuation study both presented a convincing argument for investment in flood release measures in the Waza Logone floodplain as a mechanism for rural poverty alleviation and sustainable livelihood development, and also highlighted the high economic costs to poor rural populations of having failed to take environmental values into account when the original investment in the irrigation scheme was made.

IUCN, 2003. Ream National Park, Cambodia: Balancing the local opportunity costs of wetland protection. Case Studies in Wetland Valuation #3. IUCN – The World Conservation Union, Asia Ecosystems and Livelihoods Group, Colombo

<http://www.waterandnature.org/econ/CaseStudy03ream.pdf>

After their virtual destruction during the civil war, Cambodia's protected areas are slowly starting to be rebuilt. It is clear that if Cambodia's renewed efforts at conserving protected areas are to succeed, then consideration of the economic needs of poor local communities will be a critical factor in management planning. This case study describes assessment of the economic value of local resource use in Preah Sihanouk (Ream) National Park, a coastal protected area in Cambodia which is piloting both a management planning process and community approaches to conservation. Household and village level surveys found that almost all local residents depend on Park resources in some way for their basic subsistence and income, to a net value of some \$1.2 million a year or an average of \$220 for every household living in and beside the National Park, which is extremely significant in an area where the median family income is estimated at only \$316 a year. The park provides land, resource and services which together contribute fisheries and agricultural sector income of more than \$0.5 million a year each, and forest resource values worth \$177,000. Given the high levels of poverty in park adjacent communities, and the difficulty of accessing alternative sources of income and subsistence, the local opportunity costs of resource utilisation foregone may be untenable. The study demonstrates the high reliance of community livelihoods on park resources and to quantify the high local opportunity costs of switching from activities that degrade wetland biodiversity. It also underlines the importance of factoring community concerns into park management planning, as well as integrating protected area concerns into socioeconomic development planning in surrounding Provinces, Districts and Communes.

IUCN, 2003. Nakivubo Swamp, Uganda: Managing wetlands for their ecosystem services. Case Studies in Wetland Valuation #7. IUCN – The World Conservation Union, Asia Ecosystems and Livelihoods Group, Colombo

<http://www.iucn.org/themes/wani/econ/Case%20Study07Nakivubo.pdf>

This case study describes a pilot study carried out in Nakivubo Swamp in Kampala, which focused on the economic value of wetland wastewater purification and nutrient retention functions. The majority of the low-cost residential settlements abutting Nakivubo are excluded from the municipal sewerage system. More than 33,000 persons discharge domestic wastes into the wetland, either through runoff or groundwater inflows while the intake for all of

Kampala's piped water supply is located some 3 km to the south west of the wetland's outflow into Murchison Bay. Nakivubo plays a significant role in maintaining the quality of both the city's water supply and the open waters of the Murchison Bay. The valuation showed that the wastewater purification and nutrient retention services of Nakivubo Swamp have a high economic value – between US\$ 1 million a year (using replacement cost methods) and \$1.75 million a year (using mitigative expenditures methods). Even taking account of the costs of managing the wetland so as to simultaneously optimise its waste treatment potential and maintain its ecological integrity (some US\$ 235,000) results in a significant net benefit. Nakivubo helps to fill the gap between the level of basic goods and services that government is able to provide, and that which rapidly increasing and poor urban populations require. The study made the point that, contrary to the dominant development imperative, residential and industrial development in Kampala's wetlands does not necessarily make good economic sense, and cannot be based only on consideration of immediate financial gain. These expectations of private profits also have to be balanced against the broader social and economic costs which arise from urban wetland degradation and loss.

IUCN, 2003. Indus Delta, Pakistan: Economic costs of reduction in freshwater flows. Case Studies in Wetland Valuation #5. IUCN – The World Conservation Union. Asia Ecosystems and Livelihoods Group, Colombo

<http://www.iucn.org/themes/wani/econ/CaseStudy05Indus.pdf>

Failure to recognise downstream ecosystem needs has often led to water allocation decisions being made that are neither economically nor ecologically optimal. This case study describes the economic costs that have occurred as a result of inadequate freshwater allocation to the Indus Delta in Pakistan. Especially, it focuses on the crippling environmental economic costs that upstream water allocation decisions have incurred to poor local populations, manifested through declining agricultural yields and fisheries production. Analysis of the data collected during the study showed that reduced freshwater flows, and consequent ecosystem degradation, had impacted heavily on local livelihoods and economic production in the Indus Delta area. The three Talukas or 30,000 households considered in the study had incurred average annual losses of \$70,000 in crop damage and \$45,000 from reduction in fish catches as a result of saltwater intrusion. On a broader level, other studies had shown that rapidly escalating mangrove loss has seriously jeopardised the livelihoods of more than 135,000 people who rely on mangrove products to a total economic value of some \$1.8 million a year for fuelwood and fodder, and a coastal and marine fisheries sector that generates domestic and export earnings of almost \$125 million. For now, national policies have opted to allocate scarce water so as to maximise financial and commercial returns to agriculture – often at the cost of natural ecosystems, and of some of the country's poorest communities.

IUCN, 2004. The Kala Oya River Basin, Sri Lanka: Where small irrigation tanks are not really small. Case Studies in Wetland Valuation #9. IUCN – The World Conservation Union, Asia Ecosystems and Livelihoods Group, Colombo

<http://www.iucn.org/themes/wani/econ/CaseStudy09KalaOya.pdf>

Traditional irrigation tank systems form a vital component of both the natural and man-made landscape in Sri Lanka. Providing irrigation water, domestic supplies and natural resources to millions of people, they also constitute one of the richest sources of wetland biodiversity in the country. Yet traditional tank systems are also under severe, and increasing, threat – which is, in turn, both putting in danger livelihood security and threatening the status of biodiversity. These threats arise from multiple sources, including upstream water allocation decisions which marginalise traditional tank systems in favour of seemingly more productive uses such as “modern” large-scale irrigation and hydropower, as well as from situation and sedimentation arising from unsustainable land use practices in upper catchments. This case study describes an exercise that was undertaken in the Kala Oya Basin of Sri Lanka to assess the livelihood and biodiversity values of traditional tank systems. The results of the valuation study showed that tanks in the Kala Oya Basin yield an average value of US\$ 425 per household per year in terms of water and aquatic resource use, or almost \$3,000 per hectare of inundated area. The findings of the Kala Oya study underline the importance of looking at livelihood and environmental values when land use and water allocation decisions are made. They also illustrate the linkages between different parts of river basins, and show how land and water decisions made in one area can have significant economic, livelihood and environmental impacts on other locations and human populations.

IUCN, 2005. Veun Sean Village, Stoeng Treng Ramsar Site, Cambodia: Rapid, participatory assessment for wetland valuation. Case Studies in Wetland Valuation #11. IUCN – The World Conservation Union, Asia Ecosystems and Livelihoods Group, Colombo
http://www.iucn.org/en/news/archive/2001_2005/press/case-study-stoeng-treng.pdf

This brief describes a case study application of “participatory approaches” to assess the importance of wetland resources to people from Veun Sean, a small island village located in the Mekong River within the Ramsar site. The study goes beyond quantitative assessment to understand the context in which resource-use decisions are made - and the linkages between poverty and the importance of wetland resources. For example, many households depend almost entirely on water from the Mekong River, which is the only means of transport from the village to services such as markets and medical centres. In Veun Sean, the value of wetlands is about 13 million Riel (\$3200) per household per year. Poorer households are more dependent on wetland resources for providing food security and income. They are also likely to be more vulnerable to losses in fisheries and wetlands resources, particularly in terms of their capacity to deal with shocks and stresses such as poor health, drought, and livestock deaths. All households in Veun Sean, but particularly the very poor, are vulnerable to pressures which limit their capacity to cultivate land to grow rice and produce. In this context of interrelated pressures of poor health, drought and rice shortages, both fish and non-fish wetland resources are critical to villagers’ livelihoods – for both nutrition and income. However, it is equally critical to consider access to these fisheries and other wetland resources. The poorest households have limited access to land, labour, transport to markets, health care, or alternative sources to income.

Loth. P. 2004. The Return of the Water: Restoring the Waza Logone Floodplain in Cameroon. Gland: IUCN

Lutz, E., S. Pagiola and C. Reiche. 1994. The costs and benefits of soil conservation: the farmer’s viewpoint. World Bank Research Observer. 9(2): 273-295

Maclean, I., R. Tinch, M. Hassall and R. Boar, 2003. Social and Economic Use of Wetland Resources: A case study from Lake Bunyonyi, Uganda. Working Paper ECM 03-09, Centre for Social and Economic Research into the Global Environment, Norwich
http://www.uea.ac.uk/env/cserge/pub/wp/ecm/ecm_2003_09.pdf

Despite the importance of Ugandan wetlands in sustaining rural livelihoods, widespread drainage and habitat degradation has occurred. In this paper, the authors examine the important factors contributing to unsustainable levels of resource use and habitat destruction around Lake Bunyonyi in southwest Uganda. The results indicate that, despite apprehension about a lack of awareness of the hidden costs of wetland drainage amongst rural householders, information failure contributes little to misuse of swamp resources in swamps fringing Lake Bunyonyi. Instead, wetlands are degraded because the benefits of sustainable use are often not accrued by those that incur the costs of misuse. High population densities and resulting land pressures have led to considerable translocation of rural householders, which has contributed to breakdown of collaborative management. Previously, many swamps were considered to be under common ownership and individuals co-operated, but recently property rights structures have shifted to open access where individuals pursue selfish strategies. Their results also suggest that private ownership would discriminate against the poorest sectors of society. The role of swamp products (papyrus, fish and crops grown in the swamp) in smoothing annual fluctuations in income, and reducing the mismatch between, income and expenditure are examined. Analysis of Lorenz curves suggest swamp products (papyrus and fish) result in a reduction of income inequality within the local economy. Similarly an improvement in the Gini Coefficient from 0.137 to 0.356 is observed if the contribution of swamp goods to household incomes is included in analyses. The implications and relevance of these results to policy makers are discussed.

Meusch, E., J. Young-Aree, R. Friend and S. Funge-Smith, 2003. The Role and Nutritional Value of Aquatic Resources in the Livelihoods of Rural People – a participatory assessment in Attapeu Province, Lao PDR. FAO Regional Office Asia and the Pacific, Bangkok
<http://govdocs.aquake.org/cqi/reprint/2006/101/1010470.pdf>

This assessment is intended to address the concern that the ecological and livelihood functions and values of rice fields and adjoining wetlands are not fully appreciated in development planning. A participatory assessment was conducted in Attapeu Province, Lao PDR to determine the role of aquatic resources in the nutritional status of people engaged in rural livelihoods and to determine any opportunities, constraints or threats that may exist

concerning the management of aquatic resources and future development in the province. The results of these activities illustrate that a broad diversity of aquatic plants and animals (approaching 200 species) are frequently accessed and used by villagers, and that fish and other aquatic animals make up the main animal protein sources in peoples' diets. Local conditions concerning health and nutrition, however, are quite low and evidence of malnutrition (underweight, stunting, and wasting) was observed in significant numbers of people in all three villages. Typical diets are insufficient in terms of quantity and quality, and are especially low in protein and fats. These findings indicate that strategies for rural development, food security, and poverty alleviation in these areas need to pay special attention to aquatic resources management to ensure the health and well-being of rural people. Integrated management of freshwater and wetland resources is necessary to meet objectives of increased rice production whilst maintaining the viability and productivity of the aquatic resources upon which rural livelihoods depend.

Sanctuary, M., H. Tropp and L. Haller. 2005. Making Water a Part of Economic Development: The Economic Benefits of Improved Water Management and Services. Stockholm: Stockholm International Water Institute

Can be downloaded from: http://www.earthscape.org/r1/ES16221/CSD_Economics.pdf (6MB)

Improved water supply and sanitation and water resources management boosts countries' economic growth and contributes greatly to poverty eradication. Resolving water related challenges requires that the costs for improved water supply and sanitation and water resources management be seen as sound public and private investments and key to a strategy that boosts economies, enables individuals and businesses to explore new income opportunities and provides them with a fair chance to prosper. Simply put, water and related services must be made part of the economic development business.

Turpie, J., B. Smith, L. Emerton and J. Barnes. 1999. Economic Valuation of the Zambezi Basin Wetlands. Harare: IUCN. Summarised in IUCN, 2003. Barotse Floodplain, Zambia: Local Economic Dependence on Wetland Resources. Case Studies in Wetland Valuation No. 2. Gland: IUCN

Winpenny J., 2003. Financing Water For All: Report of the World Panel on Financing Water Infrastructure. World Water Council, 3rd World Water Forum and Global Water Partnership

Woodward, R. and Y. Wui. 2001. The economic value of wetland services: a meta-analysis. Ecological Economics. 37(2): 257-270

3.7 Wildlife and protected areas

Ashley, C. and D. Roe, 1998. Enhancing Community Involvement in Wildlife Tourism: Issues and challenges. Wildlife and Development Series No 11, International Institute for Environment and Development, London

Can be purchased from: <http://www.earthprint.com/show.htm?url=http://www.earthprint.com/cgi-bin/ncommerce3/ProductDisplay?prfnbr=81884&prmenbr=27973>

In many countries, efforts are already being made to enhance involvement of rural communities and the poor in the tourism industry. However experience to date has shown that there are many limitations and challenges. This book explores some of these challenges and identifies strategies for addressing them, based on experience in a range of countries. It concludes that developing wildlife tourism in ways that are more appropriate for poor communities requires considerable time and effort: extension inputs, participatory planning, conflict-resolution procedures. A vital first step is to focus attention of different stakeholder groups on community involvement as a priority and not just as an add-on to macro-economic, environmental or marketing concerns. Experience to date suggests that wildlife tourism may bring as many costs as benefits to poor communities. But this is all the more reason to invest effort in community involvement, as many of the costs can be mitigated. A range of measures can be used to enhance communities' market power, while combining social development issues with the economic development opportunities that tourism brings.

Barnes, J. 2002. The economic returns to wildlife management in Southern Africa. In D. W Pearce, C. Pearce and C. Palmer (eds). Valuing the Environment in Developing Countries: Case Studies. Cheltenham: Edward Elgar: 274-288

Barnes, J., J. MacGregor and C. Weaver. 2002. Economic analysis of community wildlife use initiatives in Namibia. *World Development*. 30(4): 667-681

Bassett, T.J., 2005. Card-carrying Hunters, Rural Poverty and Wildlife Decline in Northern Côte d'Ivoire. *The Geographical Journal* 171(1): 24-35, Overseas Development Institute, London
http://www.geog.uiuc.edu/people/Geog_Journal_ms.pdf

This paper examines wildlife decline in northern Côte d'Ivoire with emphasis on the political-economic and cultural dimensions of market hunting. Hunting and the trade in wild animal meat are situated within the economic diversification strategies of impoverished farmers and the flourishing of hunter associations. The role of hunter associations is critical in the rise in the number of hunters and firearms in the case study area of Kakoli. Initiation into the national hunters' association, Binkadi, allows card-carrying members to bear arms without legal repercussions. Higher quality arms and rural poverty motivate many of these recruits to engage in market hunting. Game market surveys for 1981–82 and 1997–99 in Kakoli show tremendous pressure on both vulnerable and robust species alike. Game depletion is conceptualized as the outcome of interacting social and biophysical processes that produce hunting pressure and habitat change. By drawing attention to the political-economic, ecological, and cultural dimensions of wildlife decline, this study implicates a diversity of actors and institutions in the dynamics of game depletion.

Bruner, A., R. Gullison and A. Balmford. 2004. Financial costs and shortfalls of managing and expanding Protected Area systems in developing countries. *Bioscience*. 54(12): 1119-1126

Carret, J. -C. and D. Loyer. 2003. Madagascar Protected Area Network Sustainable Financing: Economic Analysis Perspective. World Parks Congress, Durban

Chape, S., J. Harrison, M. Spalding and I. Lysenko. 2005. Measuring the extent and effectiveness of protected areas as an indicator for meeting global biodiversity targets. *Philosophical Transactions of the Royal Society B*. 360: 443-455

De Lopez, T., K. Vibol, S. Proeung, P. Dareth, S. Thea, C. Sarina, S. Song, V. Chantha, N. Vandy, L. Bunly and C. Sineoun, 2001. Policy Options for Cambodia's Ream National Park: A stakeholder economic analysis. Research Report, Environment and Economics Program for Southeast Asia (EEPSEA), International Development Research Centre (IDRC), Ottawa
http://www.idrc.ca/en/ev-8195-201-1-DO_TOPIC.html

Forestland in Ratanakiri represents an extremely valuable natural resource that needs to be correctly managed if its benefits are to be maximised. Despite the lack of a land use plan for the province, a number of commercial development activities are underway, resulting in the destruction of pristine forest areas. Because local communities in Ratanakiri are totally dependent on the forest and the rapid rate of deforestation is evident throughout Cambodia, sustainable forest management options urgently need to be identified for the area. This study compares two key land uses—the value of using the forest land for traditional purposes (such as the harvesting of NTFP) against its use for commercial timber extraction. The results show that the benefits from traditional sustainable use of forest resources exceed the benefits of commercial timber extraction in the study area by at least US\$200 per hectare (NPV over a 90-year period). This suggests that areas of high cultural value and environmental significance might best be managed by local communities.

Development Services and Initiatives. 2004. A Financial and Economic Analysis of the Costs and Benefits of Managing the Protected Area Estate. Zambia: Ministry of Tourism, Environment and Natural Resources

De Merode, E., K. Homewood and G. Cowlshaw, 2003. Wild Resources and Livelihoods of Poor Households in Democratic Republic of Congo. ODI Wildlife Policy Briefing Number 1, Overseas Development Institute, London
<http://www.odifpeg.org.uk/publications/policybriefs/wildlifepolicy/1.html>

Wild foods including bushmeat have long been recognised as important famine foods underpinning coping strategies for poor people. Yet there is mounting pressure from conservation agencies to limit the extraction of wild resources, particularly bushmeat. Attempts to integrate conservation and development aim for ecologically and socially sustainable wild resource use, but there are few detailed studies of the real implications of local use of wild foods for either conservation or development. This paper outlines research on the links between poverty and wild food use in a poor community of Congolese farming households.

Policy conclusions include that there is a need to shift the bushmeat debate onto more positive terrain, recognising the many benefits which the trade in wild meat offers the range state economies. There are strong practical and moral arguments to favour increased engagement by development assistance agencies in this debate. The arguments in favour of bushmeat as a component of social safety nets are strong; those relating to its possible role in economic transformation are less well understood. Bushmeat could well figure as a component of governance reform; this would have implications for the policies of international conservation agencies quite as much as range state governments. Strategies of governance reform would include legal and regulatory reform, in a pro-poor direction. These must be linked to the establishment of channels of legitimate trade, if the reforms are not merely to drive this lucrative industry further underground.

Livestock and Wildlife Advisory Group, 2002. Wildlife and Poverty. UK Department for International Development (DfID), London

<http://www.bushmeat.org/pdf/DFIDWildlifePovertyStudy.pdf>

The Wildlife and Poverty Study aims to assess how and why wildlife is important to the livelihoods of the poor and vulnerable, reviews the key underlying policy and institutional issues, investigates the synergies and trade-offs between donor strategies and, from the answers to these, develops recommendations for appropriate DfID strategy and intervention. For the majority of the estimated 231 million poor people who live in marginal areas of South Asia (130 million) and Sub-Saharan Africa (101 million), livelihood opportunities are limited. A significant proportion of their food is hunted or collected from the wild, particularly in times of stress, such as drought. Medicines, fuel and building materials are collected from the wild. Poor people use wild resources to build and diversify their livelihoods and are often key to local cultural values and traditions. These same people must also bear the costs of living with wildlife, particularly in terms of threat to lives and livelihoods. The case studies confirm and add to the body of evidence for the positive livelihood and food security impact of wildlife, particularly through tourism and bushmeat, on poor people's lives. Conservation initiatives also often come at the expense of poor peoples' livelihoods; both directly in terms of unfair distribution of net benefit flow from conservation and indirectly from the opportunity cost of land. However, for many of these marginalised areas the potential for wildlife to be a source of long-term competitive advantage is underestimated. As wildlife scarcity increases, so the intrinsic and commercial value of remaining reserves increases, thus increasing the opportunities for the poor to build viable wildlife-based livelihood strategies. The study concludes that there is sufficient evidence of wildlife-poverty linkages, and of the unique role played by DfID in encouraging poverty-led wildlife development, to warrant continued DfID investment in wildlife related interventions.

Emerton, L., 1999. Balancing the Opportunity Costs of Wildlife Conservation for Communities Around Lake Mburo National Park, Uganda. Evaluating Eden Discussion Paper No. 5, Institute for Development Policy and Management, University of Manchester and IIED

http://www.poptel.org.uk/iied/docs/blq/eden_dp5.pdf

This paper addresses the financial and economic impacts of a community-based approach to wildlife conservation in Lake Mburo National Park (LMNP), Uganda. It seeks to investigate how a National Park such as Lake Mburo which generates few revenues and is subject to extensive pressures from surrounding human populations can be seen as a financially and economically sustainable land use. The main focus of the paper is the economic competition between protected areas and agricultural land uses, the opportunity costs of wildlife conservation to poor rural communities and the attempts made as part of the community conservation programme by Park managing authorities to offset local wildlife costs. At \$230,000 a year, the direct and indirect local benefits generated by the park are less than a third of the value of park-related losses and costs. Given this mismatch in both the quality and form of LMNP's benefits and costs at the local level it is hardly surprising that human-park conflicts continue. Local communities are largely unwilling – and in many cases economically unable – to bear these uncompensated costs. Park authorities, already over-stretched in both budgetary and human resource terms, find it difficult to control unsustainable and illegal use of LMNP's land and resources. Although community conservation efforts represent a major step forward in improving relations between the park authorities and adjacent residents, they have so far proven inadequate to offset the high and rising local opportunity costs of LMNP. In conclusion, the paper questions whether conserving wildlife in LMNP can be sustainable in the future in economic terms for surrounding communities, and in financial terms for the Government of Uganda.

Emerton, L., 2000. The Nature of Benefits and the Benefits of Nature: Why wildlife conservation has not economically benefited communities in Africa. Paper No. 5, Community Conservation Research in Africa: Principles and Comparative Practice. Institute for Development Policy and Management, University of Manchester

http://www.sed.manchester.ac.uk/idpm/publications/archive/cc/cc_wp05.htm

Benefit distribution is a necessary, but in itself may not be a sufficient, condition for poor 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. One-dimensional, benefit-based approaches have formed the guiding principle for many of the community wildlife conservation activities implemented in East and Southern Africa over the last decade. Most of these activities aim to redistribute wildlife revenues to local communities as broad development benefits. This paper argues that although the economic rationale to benefit-based approaches to community wildlife conservation is sound - if local communities do not benefit from wildlife they are unlikely to be willing or able to conserve it - it is incomplete. Generating broad development benefits does not ensure that the presence of wildlife generates a net local economic gain and is not the same as providing economic incentives for conservation.

Emerton, L. and I. Mfunda, 1999. Making Wildlife Economically Viable for Communities Living Around the Western Serengeti, Tanzania. Evaluating Eden Series, Working Paper No.1. Evaluating Eden Project (IIED) and the Community Conservation Research Project (Universities of Manchester, Zimbabwe, and Cambridge, and the African Wildlife Foundation)

http://www.poptel.org.uk/iied/docs/blg/eden_dp1.pdf

Serengeti National Park, Grumeti and Ikorongo Game reserves all generate substantial revenues for the Tanzania National Parks Authority, the Wildlife Department and Serengeti and Bunda District Councils, as well as for private sector tour operators doing business in the area. Historically, little of this funding has flowed to poor local communities. As land pressure has grown, however, and reliable sources of income and employment have become harder to access, local communities have become less willing — and in some cases economically unable — to conserve wildlife and other natural resources on their lands. With a strong economic and conservation interest in conserving wildlife, both public agencies and private enterprise have developed a variety of revenue sharing arrangements to ensure that the benefits of wildlife flow to local communities. Local perceptions of wildlife seem to have improved since these mechanisms were introduced in the mid 1990s. Poaching and other forms of illegal resource use have declined. Conflicts between local villagers and wildlife authorities are less frequent and severe. Villages that have negotiated land lease arrangements with private companies have begun to engage more actively in wildlife conservation, and there is greater tolerance and acceptance of wildlife incursions onto village land. Nevertheless, the funding schemes have had little impact in redressing the overall imbalance of local wildlife costs and benefits. Total wildlife-related costs in the western Serengeti are estimated at over US\$1 million a year, or US\$110 per household, while local revenues and other community benefits generated by the schemes described above are estimated at less than US\$75,000 per year, or US\$8 per household. While community financing arrangements have helped to change local perceptions and improve outcomes for wildlife, it is also clear that much more substantial benefit-sharing will be required in order for wildlife conservation to become competitive with alternative (agricultural) land uses.

Engelbrecht, W. and P. van der Walt. 1993. Notes on the economic use of the Krueger National Park. *Koedoe*. 36(2): 113-119

English, J., M. Tiffen and M. Mortimore, 1994. Land Resource Management in Machakos District, Kenya 1930-1990, (World Bank Environment Paper No 5), Washington, D.C.: World Bank

Fa, J. and Currie, D. 2003. Bushmeat and food security in the Congo Basin: Linkages between wildlife and people's future. *Environmental Conservation*. 30 (1): 71-78

Fischer, C., E. Muchapondwa and T. Sterner, 2005. Bioeconomic Model of Community Incentives for Wildlife Management Before and After CAMPFIRE. Discussion Paper 05-06, Resources for The Future, Washington DC.

<http://www.rff.org/Documents/RFF-DP-05-06.pdf>

This paper formulates a bioeconomic model to analyze incentives for poor local communities to engage in wildlife management under benefit-sharing programs like the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe. Two agents influence the wildlife stock: a parks agency determines hunting quotas, and a local community chooses to either aid or discourage outside poachers. Wildlife generates revenues from hunting licenses and tourism; it also intrudes on local agriculture. We consider two benefit-sharing regimes: shares of wildlife tourism rents and shares of hunting licenses. Resource sharing does not necessarily improve community welfare or incentives for wildlife conservation. Results depend on the exact design of the benefit shares, the size of the benefits compared with agricultural losses, and the way in which the parks agency sets hunting licenses.

Ghate, R. 2002. Global gains at local costs: Imposing protected area: evidence from India. *International Journal of Sustainable Development and World Ecology*. 10: 377-389

Godoy, R., D. Wilkie, V. Reyes-Garcia, W. Leonard, T. Huanca, T. McDade, V. Vadez and S. Tanner. 2005. Human Body-mass Index as a Useful Proxy to Assess the Effect of Income on Wildlife Consumption in Low-income Rural Societies. Waltham, Massachusetts: Wildlife Conservation Society. Mimeo

Gong, Y., 2004. Distribution of Benefits and Costs among Stakeholders of a Protected Area: An Empirical Study from China. Research Report, Environment and Economics Program for Southeast Asia (EEPSEA), International Development Research Centre (IDRC), Ottawa

http://www.idrc.ca/en/ev-64249-201-1-DO_TOPIC.html

This report provides information on the impact of a new conservation regime in the Fanjingshan National Reserve (FNNR) in Guizhou Province, China. It calculates the economic and social effects that this regime will have on the livelihoods of poor people living inside the reserve. It shows that, if local people are not compensated for lost incomes, the new plans will increase conflict between locals and the reserve management. To find a way to pay compensation, the study investigated whether people living in the province around the reserve would be willing to pay for conservation in the FNNR through an eco-tax. These people benefit from conservation in the reserve, but at present pay nothing towards it. The report finds that they would be willing to pay and that the amount that could be collected would more than cover of compensating those affected inside the protected area.

Inamdar, A., D. Brown and S. Cobb, 1999, What's Special About Wildlife Management in Forests? Concepts and models of rights-based management, with recent evidence from West-Central Africa. ODI Natural Resource Perspectives No 44, Overseas Development Institute, London

<http://www.odifpeg.org.uk/publications/policybriefs/nrp/44.html>

Wildlife consumption is an integral part of the livelihood and trade patterns of many peoples in the developing world, and highly valued by them. Yet to date the dominant models of wildlife management in areas of high – and allegedly unsustainable – consumptive use have favoured the exclusion of the users from the resource and the denial of its local values. This gives little incentive to rural dwellers to manage wildlife sustainably. Innovative strategies are required to enhance the rights of the resource users and to increase their entitlements to appropriate the benefits of wildlife for themselves. There has been little success in devising these outside areas with high tourist potential, but experience in other natural resource sectors may provide useful pointers. Strategies of wildlife management differ according to the nature of the threat to the resource, the two main threats being habitat conversion and unsustainable off-take. Where the threat is from unsustainable off-take, there are strong arguments not to apply blanket preservationist controls. The solutions to the problem of unsustainable offtake have more to do with management than public education or awareness-raising. Devising policies for the sustainable management of wildlife is a complex and challenging task with many unknowns; where the considerable additional transaction costs of managing wildlife cannot be offset against new benefits (from sport hunting and tourism, for example), alternative

management strategies have to be adopted which explicitly promote equity and sustainability. Conventional solutions to the problem of excessive use, such as privatisation of tenure and the reinstatement of traditional control systems are very uncertain routes to poverty alleviation. Rights-based management systems, enabling people to negotiate access and assert their entitlement to resources, are an important tool to broker better development opportunities. Examples of such regulatory systems from other natural resource sectors, such as inshore fisheries, may provide useful models to regulate the off take and enable the poor to define their rights to wildlife resources in communal management regimes.

Madhusudhan, M., 2003. Living Amidst Large Wildlife: Livestock and crop depredation by large mammals in the interior villages of Bhadra Tiger Reserve, South India. Environmental Management Vol. 31, No. 4, pp. 466–475

<http://www.ncf-india.org/pubs/Madhusudan%202003a.pdf>

Conflict with humans over livestock and crops seriously undermines the conservation prospects of India's large and potentially dangerous mammals such as the tiger (*Panthera tigris*) and elephant (*Elephas maximus*). This study, carried out in Bhadra Tiger Reserve in south India, estimates the extent of material and monetary loss incurred by resident villagers between 1996 and 1999 in conflicts with large felines and elephants, describes the spatiotemporal patterns of animal damage, and evaluates the success of compensation schemes that have formed the mainstay of loss-alleviation measures. Annually each household lost an estimated 12% (0.9 head) of their total holding to large felines, and approximately 11% of their annual grain production (0.82 tonnes per family) to elephants. Compensations awarded offset only 5% of the livestock loss and 14% of crop losses and were accompanied by protracted delays in the processing of claims. Although the compensation scheme has largely failed to achieve its objective of alleviating loss, its implementation requires urgent improvement if reprisal against large wild mammals is to be minimized. Furthermore, innovative schemes of livestock and crop insurance need to be tested as alternatives to compensations.

Mburu, J., R. Birner and M. Zeller, 2003. Relative Importance and Determinants of Landowners' Transaction Costs in Collaborative Wildlife Management in Kenya: An empirical analysis. *Ecological Economics* 45: 59-73

Can be purchased from <http://www.sciencedirect.com/science/article/B6VDY-484SNFT-1/2/ba52c3ff1ef883e58efa50c4d5187bcb>

Collaborative management of protected areas /which involves state agencies, local communities and other stakeholders /has been identified as a promising approach of organising nature conservation. However, as a complex governance structure, co-management can be expected to involve considerable transaction costs for the participating stakeholders. Empirical studies concerning the quantification of these costs are still scarce. Against this background, this paper empirically analyses the relative importance and the determinants of the landowners' transaction costs arising from collaborative wildlife management, taking two wildlife sanctuaries in Kenya as examples. The empirical data presented in this paper was collected in the wildlife dispersal areas of Shimba Hills National Reserve and Amboseli National Park in Kenya. The results of this study show that as compared to other cost categories, the landowners' transaction costs incurred in wildlife co-management were relatively low. They also indicate that the magnitude of the transaction costs incurred by landowners is influenced by the attributes of transactions; bio-physical and ecological characteristics of the resource systems; landowners' characteristics such as their human, social and financial forms of capital; losses resulting from human/wildlife conflicts; tenure security and benefits from conservation. Comparing the results of a two-stage least squares regression model of landowners' characteristics of the two wildlife sanctuaries, it was found that the level of significance and the sign of most variables are not the same for both areas. This indicates that it is a specific combination of local factors that influences the transaction costs borne by the landowners.

Shackleton, S., C. Shackleton and B. Cousins, 2000. Re-valuing the Communal Lands of Southern Africa: New understandings of rural livelihoods. ODI Natural Resource Perspectives No 62, Overseas Development Institute, London

<http://www.odi.org.uk/nrp/62.pdf>

This paper reviews recent valuation studies in the communal lands of several southern African countries. The significance of common pool resources and a range of agricultural goods and services for livelihood security and household income, particularly for the most vulnerable segments of rural society, is highlighted. The paper examines reasons for under-valuation of

communal lands in the past and challenges the assumption that the creation of labour reserve economies in southern Africa decreased rural people's dependence on the natural resource base and acted as a disincentive for land-based activities. Public investment in enhancing income from natural resources – including wild resources – in communal lands can be an effective means of promoting local economic development and diversification into non-farm income sources. Enhancing land-based livelihoods will require investment in improved infrastructure and government services. Redistributive land reforms which expand communal lands and their characteristic livelihood systems do not necessarily create 'poverty traps', and have the potential for significant economic development and poverty reduction. Policies enhancing security of land tenure in communal areas will assist in raising the contribution of NR to livelihoods. The enhancement of resource productivity in a Sustainable Livelihood context can increase both livelihood security and market participation; to propose a stark 'either/or' choice between 'commercial' and 'subsistence' farming is unrealistic.

Southgate, D., 1997. Alternatives for Habitat Protection and Rural Income Generation. InterAmerican Development Bank Paper No. ENV-107, Washington D.C.

<http://www.iadb.org/sds/doc/Southgate.pdf>

One way to reconcile habitat protection and local economic well-being is to promote economic activities that are both remunerative and environmentally benign. It has been suggested that nature-based tourism, the extraction of non-timber forest products, environmentally sound timber production, and genetic prospecting might fit these two criteria. The key question the research in this paper tries to answer is whether those four activities truly represent a viable economic alternative in Latin America's environmentally fragile hinterlands. Several cases in each line of activity are analyzed to determine the level and distribution of the net financial returns they generate. Special attention was devoted to examining the degree to which net returns flow to local populations, as opposed to other economic agents. In general, examination of the rewards local populations can expect to derive from ecotourism and the harvesting of non-timber forest products suggests that allocating time and effort to those activities is unlikely to be very remunerative since unskilled labour is not particularly scarce in rural areas. In addition, little is to be gained by controlling access to natural resources, which for the most part are abundant. Moreover, making the sector-specific human capital and other investments needed for forest dwellers to capture more of the net returns from ecotourism, genetic prospecting, and so forth would probably not benefit them very much. Instead, furnishing them with education and training that is broadly applicable across the entire economy makes more sense.

Mburu, J. and R. Birner. 2002. Analyzing the efficiency of collaborative wildlife management: The case of two community wildlife sanctuaries in Kenya. *International Journal of Organization Theory and Behavior*. 5 (3&4): 359-397

Moran, D. 1994. Contingent valuation and biodiversity: measuring the user surplus of Kenyan protected areas. *Biodiversity and Conservation*. 3: 663-84

Pearce, D. W. 1999. The economics of African wildlife utilization. In D. W. Pearce. *Economics and Environment: Essays in Ecological Economics and Sustainable Development*. Cheltenham: Edward Elgar. 210-230

Swanson, T. and A. Kontoleon. 2000. Why Did the Protected Areas Fail the Giant Panda? *World Economics*. 1(4): 135-148

van Beukering, J., H. Cesar and M. Janssen. 2003. Economic valuation of the Leuser National Park on Sumatra, Indonesia. *Ecological Economics*. 44: 43-62

Can be purchased from <http://www.sciencedirect.com/science/article/B6VDY-47S6PRG-1/2/59249d1adde684b8f79e88e1543a3ee1>

The Leuser Ecosystem in Northern Sumatra is officially protected by its status as an Indonesian national park. Nevertheless, it remains under severe threat of deforestation. Rainforest destruction has already caused a decline in ecological functions and services. Besides, it is affecting numerous economic activities in and around the Leuser National Park. The objectives of this study are twofold: firstly, to determine the total economic value (TEV) of the Leuser Ecosystem through a systems dynamic model. And secondly, to evaluate the economic consequences of deforestation versus conservation, disaggregating the economic value for the main stakeholders and regions involved. Using a dynamic simulation model, economic valuation is applied to evaluate the TEV of the Leuser National Park over the period

2000–2030. Three scenarios are considered: ‘conservation’, ‘deforestation’ and ‘selective use’. The results are presented in terms of (1) the type of benefits, (2) the allocation of these benefits among stakeholders, and (3) the regional distribution of benefits. The economic benefits considered include: water supply, fisheries, flood and drought prevention, agriculture and plantations, hydro-electricity, tourism, biodiversity, carbon sequestration, fire prevention, non-timber forest products, and timber. With a 4% discount rate, the accumulated TEV for the ecosystem over the 30-year period is: US \$7.0 billion under the ‘deforestation scenario’, US \$9.5 billion under the ‘conservation scenario’ and US \$9.1 billion under the ‘selective utilisation scenario’. The main contributors in the conservation and selective use scenarios are water supply, flood prevention, tourism and agriculture. Timber revenues play an important role in the deforestation scenario. Compared to deforestation, conservation of the Leuser Ecosystem benefits all categories of stakeholders, except for the elite logging and plantation industry.

van Schaik, C., J. Terborgh and B. Dugelby, 1997. The silent crisis: the state of rain forest nature preserves. In R. Kramer, C. van Schaik and J. Johnson (eds.). *Last Stand: Protected Areas and the Defense of Tropical Biodiversity*. Oxford: Oxford University Press. 64-89

Weladji, R. and M. Tchamba. 2003. Conflict between people and protected areas within the Bénoué Wildlife Conservation Area, North Cameroon. *Oryx*. 37(1): 72-79

Wells, M. and K. Brandon. 1992. *People and Parks: Linking Protected Area Management with Local Communities*. World Bank, US AID, WWF. Washington, D.C.: World Bank

Wilkie, D. S., M. Starkey, K. Abernethy, E. Nstame Effer, P. Telfer and R. Godoy. 2005. Role of prices and wealth in consumer demand for bushmeat in Gabon, Central Africa. *Conservation Biology*. 19(1): 268-274

World Bank. 1996. *Haiti Forest and Parks Protection. Technical Assistance Project: Staff Appraisal Report*. T-6948-HA. Washington, D.C.: World Bank

4. Economic sector

This section contains references on issues including:

- Agriculture
- Built environment
- Energy
- Fisheries
- Mining and minerals.

4.1 Agriculture (soil, pollination, crop/livestock diversity)

Bacon, C. 2005. Confronting the Coffee Crisis: Can fair trade, organic, and specialty coffees reduce small-scale farmer vulnerability in Northern Nicaragua? *World Development*, Vol. 33 (3), pp. 497-511

<http://www.laborrights.org/projects/conference/fair-trade-coffee1.pdf>

This paper links changing global coffee markets to opportunities and vulnerabilities for sustaining small-scale farmer livelihoods in northern Nicaragua. Changing governance structures, corporate concentration, oversupply, interchangeable commodity grade beans, and low farm gate prices characterize the crisis in conventional coffee markets. In contrast, certified Fair Trade and organic are two alternative forms of specialty coffee trade and production that may offer opportunities for small-scale producers. A research team surveyed 228 farmers to measure the impact of sales on organic and Fair Trade markets. The results suggest that participation in organic and Fair Trade networks reduces farmers’ livelihood vulnerability.

Barbier, E.B., 2004. Agricultural Expansion, Resource Booms and Growth in Latin America: Implications for long-run economic development. *World Development*, Vol. 32, No. 1, pp. 137-157

<http://uwacadweb.uwyo.edu/Barbier/Agricultural%20Expansion%20Resource%20Booms%20and%20Growth%20in%20Latin%20America1.pdf>

This paper examines a number of key issues concerning agricultural land expansion, resource booms and economic growth in Latin America. The structural characteristics of agricultural development, represented by cropland share of total land area, agricultural export share of total exports and cereal yields, appears to influence agricultural land expansion in the region. Long-run agricultural land expansion may also be correlated with a "boom and bust" pattern of economic development. Contributing factors include distorted land and resource markets, ineffective property rights and the failure to target policies to improve the efficient and sustainable management of natural resources.

Barrett, C., T. Reardon and P. Webb, 2001. Non-farm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, dynamics and policy implications. *Food Policy*, Vol. 26, pp. 315-331.

Bellon, M., 2004. Conceptualizing Interventions to Support On-farm Genetic Resource Conservation. *World Development*, Vol 32, No. 1, pp. 159-172.

Lele, U. and S. Stone, 1989. Population Pressure, the Environment and Agricultural Intensification: Variations on the Boserup Hypothesis. *MADIA Discussion Papers No. 4*. Washington, D.C.: World Bank.

OECD, 1995. *Adjustment in OECD Agriculture: Issues and policy responses*. Paris: OECD.

Pagiola, S., P. Agostini, J. Gobbi, C. de Haan, M. Ibrahim, E. Murgueito, E. Ramirez, M. Rosales and J.P. Ruiz. 2004. Paying for Biodiversity Conservation in Agricultural Landscapes. Environment Department Paper 96. Washington, D.C.: World Bank
<ftp://ftp.fao.org/docrep/nonfao/lead/x6154e/x6154e00.pdf>

Adoption of improved silvopastoral practices in degraded pasture areas is thought to provide valuable local and global environmental benefits, including biodiversity conservation. However, these practices are insufficiently attractive to individual land users for them to adopt them spontaneously, particularly due to their high initial costs. This paper describes the contract mechanism developed for the Regional Integrated Silvopastoral Ecosystem Management Project, which is being implemented with financing from the Global Environment Facility (GEF). The project is testing the use of the payment-for-service mechanism to encourage the adoption of silvopastoral practices in three countries of Central and South America: Colombia, Costa Rica, and Nicaragua. The project has created a mechanism that pays land users for the global environmental services they are generating, so that the additional income stream makes the proposed practices privately profitable. Designing the mechanism required addressing issues such as (1) measuring the actual amount of environmental services being provided, so that appropriate payments can be made; (2) providing payments in a way that resulted in the desired change in land use; and (3) avoiding the creation of perverse incentives (for example, for land users to cut down existing trees so as to qualify for additional payments for tree planting). The project also includes extensive monitoring of the effectiveness of each mechanism in stimulating adoption of the proposed measures and of the resulting impact on environmental services and on household welfare. These features, together with the three-country approach, will provide in the coming years a very rich dataset for testing the use of contract mechanisms for biodiversity conservation.

Pender J., P. Jagger, E. Nkonya and D. Sserunkuuma, 2004. Development Pathways and Land Management in Uganda. *World Development*, Vol. 32, No 5., pp. 767-792

Reardon, T. and S.A. Vosti, 1995. Links between Rural poverty and the Environment in Developing Countries: Asset categories and investment poverty. *World Development*, Vol. 23, No. 9, pp. 1495-1506

Reardon, T., J. Taylor, K. Stamoulis, P. Lanjouw and A. Balisacan. 2000. Effects of Non-farm Income on Rural Income Inequality in Developing Countries: An investment perspective. *Journal of Agricultural Economics*, Vol. 51(2)

Tokarick, S., 2005. Who Bears the Cost of Agricultural Support in OECD Countries? *World Economy*, Vol. 28(4), pp. 573-593.

Can be purchased from <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1467-9701.2005.00692.x>

This paper provides quantitative estimates of the impact of removing agricultural support in both OECD and developing countries in partial and general equilibrium frameworks. The results show that agricultural support in OECD countries is highly distortionary, and tariffs have a larger distortionary impact than subsidies. Removal of agricultural support would likely raise the international prices of food, resulting in an increase in the cost of food for many net-food importing countries, although the size of the increase is generally small. The results also show that most of the benefits from removing agricultural support accrue to the countries that liberalise.

Wiebe, K., M. Soule, C. Narrod and V. Breneman, 2000. Resource Quality and Agricultural Productivity: a Multicountry comparison. Paper presented to American Agricultural Economics Association Annual Meeting, Tampa, Florida, July 2000. Washington, D.C.: USDA.

4.2 Built environment (housing, solid waste, transport)

Gonzales, E.M., 2003. From Wastes to Assets: The scavengers of Payatas. Conference Paper Series No. 7, Political Economy Research Institute and Centre for Science and the Environment. International Conference on Natural Assets, 8-11 January 2003, Tagatay City, The Philippines.

<http://www.umass.edu/peri/pdfs/CDP7.pdf>

This paper examines how poor families living in the Payatas dumpsite in the Philippines earn an income and create jobs for others by recovering and recycling wastes. The author argues that for waste pickers at the dumpsite, garbage is an asset rather than a symbol of poverty. It examines the implications of recent moves by the Government to address the landfill crisis, notably the Ecological Solid Waste Management Act passed in 2001. The paper draws on previous studies and some interviews with waste pickers and traders.

Hayami, Y., A.K. Dikshit and S.N. Mishra, 2003. Waste Pickers and Collectors in Delhi: Poverty and environment in an urban informal sector. FASID Discussion Paper on International Development Strategies No. 2003-004. Foundation for Advanced Studies on International Development, Tokyo.

<http://www.fasid.or.jp/chosa/kenkyu/senryaku/kaihatsu/pdf/discussion/2003-004.pdf>

The study aims to measure the contribution of the poor to society focusing on the waste pickers and waste collectors in the slums of North East Delhi. The study attempts to measure both the private earnings of waste pickers and the environmental benefits they provide through converting unusable waste into productive resources. The field survey conducted in 2002/3 was of a pilot scale (35 waste pickers, 35 waste collectors) and was not selected using random sampling procedures. The authors say that its findings should be taken as hypotheses to be confirmed in future larger-scale studies. Most pickers (those who pick up waste thrown away in public places) were found to have incomes below the official poverty line while collectors (those who buy waste from households and shops and restaurants) were earning slightly more than the poverty line. The pickers and collectors surveyed are mostly migrants from rural areas in other states of India and over 80% of them were illiterate. Pickers were unanimous in that their income levels were several times higher than in their home villages.

Pearce, D. W and R. Turner, 1994. Economics and Solid Waste Management in the Developing World. Mimeo. University College London and University of East Anglia: Centre for Social and Economic Research on the Global Environment.

Whittington, S., K. Komives and X. Wu, 2001. Infrastructure Coverage and the Poor: A global perspective. Policy Research Paper 2551. Washington, D.C: World Bank.

World Bank, 2000. Cities Alliance for Cities without Slums. Washington, D.C.: World Bank.

Zurbrugg, C., S. Drescher, I. Rytz, A.H. Maqsood Sinha and I. Enayatullah, 2005. Decentralised Composting in Bangladesh, a Win-win Situation for all Stakeholders. Resources Conservation and Recycling, 43 281-292.

http://www.wasteconcern.org/Publication/rcr_composting_bangladesh_zurbrugg_2004.pdf

The paper assesses the experience of a small-scale composting plant in Mirpur, Dhaka, Bangladesh, which reached full production in 2001. Two scenarios were compared:

demonstration phase capacity (1.7 tons per day) and full design capacity (3 tons per day). The project receives revenue from waste collection fees, from compost sales and from sale of recyclables. At full capacity the plant is financially viable with revenues from compost sales covering 91% of operating costs and 76% of the total annual costs (including depreciation). Total revenues at US\$16,470 per year exceed costs at US\$12,725, giving a profit of US\$3,745. However, this does not include land rent as the land for the plant was donated. Land prices in Dhaka are extremely high so including land costs in the analysis would increase costs by US\$17,100 per year. Without the land donation, the plant would not be viable. However, in smaller cities in Bangladesh, where land prices are not so high, a plant of this nature could be viable. The cost benefit calculations do not take account of the savings in waste collection and disposal costs for the municipality. These are estimated at US\$18,500 approximately. The authors conclude that this is a rare case of a successful decentralised collection and composting scheme in the developing world. Further small-scale composting plants are being built in Dhaka. The main constraint is cost and availability of land but organisations and government departments have shown willingness to make sites available.

4.3 Energy

Armitage, J. and G. Schramm. 1989. Managing the supply and demand for fuelwood in Africa. In G.Schramm and J.Warford (eds). Environmental Management and Economic Development. Baltimore: Johns Hopkins University Press

Azimi, A. and S. Tanaka, 2004. Technical Assistance to the Islamic Republic of Afghanistan for Poverty Reduction and Rural Renewable Energy Development. Technical Assistance, Asian Development Bank.

<http://www.adb.org/Documents/TARs/AFG/tar-afg-38044.pdf>

The report notes that few examples are available of alternative energy provision resulting in tangible and measurable improvements in the incomes of poor communities on any significant scale. This is because of high initial costs of technology which the poor cannot afford, limited number of locally relevant productive applications, poor communities' limited access to supply markets, the absence of efficient technology service providers, and the lack of support from central energy ministries given that their mandate is energy provision and not income generation for the poor. The Barefoot College in India is cited as an example of one of the few successful applications of solar energy in rural areas. The Barefoot College is an NGO funded by UNDP, EU and the Indian Government, which trains semiliterate and unemployed village youths to operate and maintain solar energy systems. These barefoot engineers provide community-based expertise and train villages to assemble the systems which come with a 10 year warranty. Since 1993, the Barefoot College and its associates have installed 2,300 fixed home lighting systems, 1,200 solar lanterns in 3,400 households in 114 villages with a cost-recovery fee from the poor of USD0.5 to USD1.5 a month.

Bhat, P.R., H.N. Chanakya and N.H. Ravindranath, 2001. Biogas Plant Dissemination: Success story of Sirsi, India. Energy for Sustainable Development Volume V, No.1.

<http://www.ieiglobal.org/ESDVol5No1/biogasdissemination.pdf>

Biogas is one of the environmentally sound options to provide quality fuel for rural households to replace fuelwood and other solid biomass fuels, the dominant energy sources for cooking in rural India. In 1982 the Indian Government launched the National Programme on Biogas Development to promote family-size biogas plants using bovine dung as the feedstock. Over 3 million biogas plants had been built in India by 1999 but this was well below the potential in terms of bovine dung availability estimated at 12-17 million plants. There have also been problems of performance. This study reports on a success story in the Sirsi block of Uttara Kannada where there is both high dissemination and performance of biogas plants. The success rate, of 100% of plants operating and meeting full cooking energy needs of 85% of HHs, achieved in the Sirsi area is the highest ever reported in India. The spread of biogas plants in Sirsi is nearly 8-10 times higher than the national average of 24 plants per 1000 households. All the biogas plants built in the area are still in use, meeting the full cooking energy needs of over 85% of plant-owning households. The cost of these plants range from Rs10,000 to Rs14,000, a large investment compared to the typical daily wage rate of Rs80-100. A number of reasons are presented for the success of the programme including: the relatively large cattle holdings which means sufficient dung feedstock for biogas to meet all household cooking needs; guarantees and follow-up service offered by the biogas plant

entrepreneurs, ensuring high performance; relatively high income due to areca nut and rice farming and high literacy rate means higher awareness of the need for high quality fuel for cooking, and of the correct procedures for operation and maintenance. The main policy message is the need to train a large number of entrepreneurs to provide infrastructure support and to launch an awareness programme.

Deepchand, K., 2002. Promoting Equity in Large-scale Renewable Energy Development: The case of Mauritius. Energy Policy, Volume 30 Issues 11-12, p. 1129-1142.

<http://www.afrepren.org/SI/pdfs/spdp.pdf>

This paper discusses how exploitation of bagasse, a by-product of sugar refining, to supply electricity for the national grid has had environmental benefits and also benefited small sugar farmers. About 90% of arable land in Mauritius is under sugar cane and the sugar industry still occupies a prominent position. The industry has been under pressure due to stagnating and falling world prices of sugar and therefore there have been efforts to improve efficiency and diversify the industry's revenues. A key aspect of this is the move to fully exploit bagasse not only to supply the cane milling operations but also to export electricity to the national grid. This avoids the need to dispose of surplus bagasse and replaces fossil fuels in the electricity fuel mix by renewable energy.

ESMAP (Energy Sector Management Assistance Program). 2003. Household Energy Use in Developing Countries: A Multi-country Study. Washington, D.C.: World Bank

ESMAP March 2005. Brazil Background Study for a National Rural Electrification Strategy: Aiming for universal access. Energy Sector Management Assistance Program (ESMAP). Washington, D.C.: IBRD/World Bank.

[http://wbln0018.worldbank.org/esmap/site.nsf/files/066-05+Brazil+Final.pdf/\\$FILE/066-05+Brazil+Final.pdf](http://wbln0018.worldbank.org/esmap/site.nsf/files/066-05+Brazil+Final.pdf/$FILE/066-05+Brazil+Final.pdf)

More than 12 million Brazilians have no access to electricity. Lack of electricity is particularly marked in the rural areas of North and North East of Brazil where 60% and 34% of rural households do not have electricity. In 2003 the Brazilian Government made universal access to electricity by 2010 a priority and established a new national programme for this purpose. This report examines how this goal of universal access can be met. The report argues that new low-cost solutions for the more challenging regions will have to be demonstrated and replicated, pointing out that under existing programmes the costs of connecting households to the grid in more remote areas of Brazil have exceeded US\$4000 per household. Moreover, electricity consumption of many rural households connected to the grid is very low. The report estimates that, assuming a cost of US\$700 before installation for a standard 50Wp, PV is competitive for communities larger than 45 households when the distance to the present grid is more than 11.5 km. This is assuming a private distributor. If PV is introduced by a regional operator working with local NGOs, costs will be lower and therefore it will be competitive at 6.5km from the grid. The report stresses the need to develop markets for off-grid energy services in order to reduce cost and to provide the flexibility needed for the varying demand patterns of rural users. It argues that Brazil does not have an adequate regulatory framework for off-grid systems and that it is still unclear whether village micro-grids or standalone systems based on renewable energy technologies will be considered as electrification as defined by the law.

Karekezi, S., 2002. Renewables in Africa – meeting the energy needs of the poor. Energy Policy Volume 30, Issues 11-12, p. 1059-1069.

<http://www.afrepren.org/SI/pdfs/spskr.pdf>

Using data mainly from eastern and southern Africa in published literature, this paper examines the experience with the use of five major renewable energy technologies: large-scale biomass energy, small scale biomass energy, solar photovoltaic, solar thermal and wind. It evaluates how suitable each technology is to meeting the energy needs of the urban and rural poor and proposes some key measures to encourage large-scale dissemination to the poor in Africa. Successes are highlighted such as bagasse co generation in Mauritius and the improved stoves programmes which have benefited the rural and urban poor through reduced charcoal consumption and provision of employment in stove manufacture. Failures are discussed such as the anaerobic digestion of plants in Tanzania. Some technologies such as solar photovoltaic are considered not to be benefiting the rural poor because of their high cost but could be beneficial in certain applications where combined with communication technologies or used to power vaccine refrigeration. Solar thermal technologies have also been taken up mainly by high income households, institutions and large commercial

establishments and have not benefit the urban and rural poor. Solar pasteurization of water and solar dryers for crops are identified as applications where more development work could make them deliver benefits to the poor. It is argued (but without provision of supporting cost figures) that the relatively low capital requirements of renewables and their modular nature makes them suitable for African countries. The decentralized nature of human settlements in the region with large numbers of individual scattered homesteads rather than concentrated villages, makes renewables and other decentralized energy options particularly competitive in delivering energy to the rural poor.

Kartha, S., G. Leach and S.C. Rajan, 2005. Advancing Bioenergy for Sustainable Development: Guideline for policymakers and investors. Volume III, Project Profiles and Case Studies. Energy Sector Management Assistance Program (ESMAP). Washington, D.C.: IBRD/World Bank.

[http://wbln0018.worldbank.org/esmap/site.nsf/files/300-05+Biomass+Fina+with+covers.pdf/\\$FILE/300-05+Biomass+Fina+with+covers.pdf](http://wbln0018.worldbank.org/esmap/site.nsf/files/300-05+Biomass+Fina+with+covers.pdf/$FILE/300-05+Biomass+Fina+with+covers.pdf)

This volume provides a set of descriptions of bioenergy projects and programmes drawn from both public and private sector initiatives with a special emphasis on developing countries and developing country resources and covering a cross-section of bioenergy technologies and applications. The aim is to understand the key factors contributing to success or failure with success defined as commercial viability and subsequent replication. The study does not explicitly aim to examine the impacts of these projects on the poor, being more concerned with commercial viability. The successful case of the Biomass Power Plant in Riberalta, Bolivia is particularly highlighted.

Lvovsky, K., Hughes, G., Maddison, D., Ostro, B and Pearce, D. W. 2000. Environmental Costs of Fossil Fuels: a Rapid Assessment Method with Application to Six Cities. Environment Paper 78. Washington, D.C.: World Bank.

Napier-Moore, P., 2005. Evaluation of Rural Energy Enterprise Development Projects. Featured in the REED Report, May 2005 UNEP (Unable to find original study)

<http://www.uneptie.org/energy/act/fin/docs/REEDreport.oct05.pdf>

A cost benefit analysis of eight successful enterprises supported by UNEP's Rural Energy Enterprise Development programme. Costs are defined as inputs made by REED and benefits are observed outputs that can reasonably be attributed to the REED intervention. Non-financial impacts are included as well. Biomass Energy Technology in Tanzania was found to have a B/C ratio of 7.0. The company coordinates the sourcing and supply of agricultural and other biomass wastes as fuel for the Tanga Cement Company Ltd (TCCL). This reduces fuel oil requirements for TCCL, reduces greenhouse gas emissions and generates a 43% profit margin for BETL. Women in urban areas can earn \$60 per month, collecting 40 bags of charcoal residues a day for to supply BETL. This is 25% more than the minimum wage.

REERIC, 2002. Renewable Energy Technologies in Asia: A Regional Research and Dissemination Programme Phase II. A Summary of Activities and Achievements in Bangladesh. Regional Energy Resources Information Center, Asian Institute of Technology.

<http://www.retsasia.ait.ac.th/booklets/Dissemination%20Booklets-Phase%20II/Full%20book-BD.pdf>

The programme promoted three technologies: solar photovoltaics, solar drying and biomass briquetting. This report highlights the achievements several regional research and dissemination programmes (RETs), including that of Grameen Shakti, (GS) a non-profit company and affiliate of Grameen Bank, which was established in 1996 with the objectives of delivering renewable energy systems to rural households. It is involved in R&D, manufacturing, marketing and financing of renewable energy systems. It has sold more than 11,000 solar home systems totalling 572kW and sells 400-500 systems each month through 50 offices spread nationwide. In 2001 it sold 6,561 systems compared to 156 systems in 1997. Over time GS has been able to make its payment terms more affordable. It started by asking for 50% payment up front and the remaining 50% in six monthly instalments. It now requires only 15% down payment and the remaining 85% in 36 monthly instalments. In addition to obvious social and environmental benefits of widened utilisation of renewable energy technologies, RETs in Asia activities in Bangladesh contributed in instituting a related small industrial and service sector.

Risby, L.A., 2003. The Nature and Role of Local Benefits in GEF Program Areas. Climate Change, Study Document Number Five. GEF Office of Monitoring and Evaluation, Global Environment Facility.

This paper is based on a sample of 30 GEF Climate Change projects and aims to describe their local livelihood benefits, drawing from project evaluation reports. Projects encompass interventions which encourage more efficient use of energy, sustainable transport technologies, reduce deforestation and sequester carbon or substitute fossil fuel energy generation with renewable energy technologies and adaptation. Such projects often have stated intentions to provide substantial local livelihood benefits for the rural poor but there has been little investigation of the extent to which these occur in practice. The review shows that there is a very significant range of intended local livelihood benefits from these projects, predominantly income and employment opportunities, legal and policy changes to enable increased access to new technologies, improved access to information and human capital training and skills transfer. However the projects do not systematically target or measure a broad range of livelihood benefits, particularly in health and education. The review found little evidence that projects have developed approaches to operationalise explicitly, poverty and environment linkages at the field level. Projects have concentrated on technical aspects of the delivery of GHG mitigation technologies rather on their social reception within target communities and where indicators have been used, they have been based on outputs rather than impacts. The author concludes that it was not possible from the project reporting information to accurately assess impacts on livelihoods.

Sagar, A. 2005. Alleviating energy poverty for the world's poor. *Energy Policy*. 33: 1367-72

United Nations. 2005b. *The Energy Challenge for Achieving the Millennium Development Goals*. New York: United Nations

von Moltke, A., C. McKee and M. Otto (eds). 2003. *Energy Subsidies: Lessons Learned in Assessing their Impacts and Designing Policy Reforms*. Geneva: UNEP

Wamukonya, N. and Davis, M., 2001. Socio-economic Impacts of Rural Electrification in Namibia: Comparisons between grid, solar and unelectrified households. Energy for Sustainable Development, Volume V No.3.

<http://www.ieiglobal.org/ESDVoL5No3/ruralnamibia.pdf>

Namibia has a rural electrification programme that utilizes grid and off-grid technologies, primarily solar home systems (SHS). Despite considerable investment in rural grid extension, less than 10% of rural households in Namibia have electricity supply. This study assesses the impact of the two modes of electrification on household energy consumption patterns, household welfare, and people's perception of electricity. Results from this study indicate that electrification has not had any significant impact on fuelwood consumption though electrification, whether solar or grid, has improved household welfare, but almost exclusively as a consequence of electric lighting. Other benefits such as improved security, ability to study at night and extended evenings are also linked to the provision of high-quality lighting. In addition, many electrified households now own a television and this is considered an important benefit. Ownership and use of electric stoves remains low, and so the benefits and convenience of cooking on electricity have not been realized to any great extent. Despite the supply limitations of the relatively small solar systems in place, it is concluded that, under the circumstances found in Namibia, grid electrification and solar technologies provide a similar level of benefit. Grid electrification costs in remote areas and where settlement patterns are dispersed, are considerably greater than the costs of providing solar home systems. The study therefore concludes that solar home systems are more cost-effective in providing household benefits. It argues that reforming institutional arrangements around subsidy systems so that both approaches are treated evenly, will do much to promote cost-effective rural electrification.

World Energy Council. 1999. *The Challenge of Rural Energy Poverty in Developing Countries*. London: World Energy Council

4.4 Fisheries/ aquaculture

Barbier, E., I. Strand and S. Sathirathai. 2002. Do open access conditions affect the valuation of an externality? Estimating the welfare effects of mangrove-fishery linkages in Thailand. *Environmental and Resource Economics* 21: 343-367

Can be purchased from <http://www.springerlink.com/index/6MLBBLDX021GM5MT.pdf>

Mangroves are considered ecologically important due to their role as breeding grounds and nursery habitats for off-shore fisheries. However, mangrove deforestation through conversion to shrimp aquaculture threatens this valuable function. This paper develops a 'dynamic' production function approach to analyze the influence of habitat changes on an open access fishery that faces a finite elasticity of demand. The basic model is applied to a case study of the impacts of mangrove deforestation on the artisanal marine demersal and shellfish fisheries in Thailand. By estimating parameters through pooled time-series and cross-sectional data over the 1983–1993 period for the five coastal zones of Southern Thailand, the welfare impacts of mangrove deforestation are estimated under different elasticity of demand assumptions. Under pure open access, the welfare losses estimated for mangrove deforestation in Thailand of 30 km² annually ranged from \$12,000 to \$408,000 depending on the elasticity of demand.

Bene, C., 2003. When Fishery Rhymes with Poverty: A first step beyond the old paradigm on poverty in small scale fisheries. *World Development* Vol. 31, No. 6, pp. 949-975

Can be purchased from <http://www.sciencedirect.com/science/article/B6VC6-48DXNXD-2/2/db2081c212cae293881af4add11566e4>

In this paper, we first look retrospectively at the perceptions embraced by academics, international agencies and practitioners of the relation between fisheries and poverty in developing countries and we try to identify the underlying paradigms which have structured these perceptions. The review reveals how the debate has focused on the economic (low income) and biological (overexploitation) aspects of the problem. We then revisit these perceptions in the light of the recent conclusions drawn from other sectors and in particular from the new "consensus" on poverty proposed by the international community. Incorporation of the recent research on poverty helps to show how socio-institutional mechanisms governing people's access to fisheries resources—rather than the resources themselves—play such a critical role in vulnerability to poverty. Finally, a typology identifying four different categories of intrasectoral exclusion mechanisms is developed and illustrated through empirical studies derived from African and Asian fisheries.

Briones, M., M.M. Dey and M. Ahmed, 2004. The Future for Fish in the Food and Livelihoods of the Poor in Asia. NAGA, WorldFish Center Quarterly, Vol. 27, No. 3 & 4

<http://www.worldfishcenter.org/naga/naga27-3n4/pdf/article09.pdf>

Asia is the world's leading fish producer. It accounts for over 63 percent of total fish production, and as much as 90 percent of all aquaculture output. Low value fisheries and aquaculture, which contribute significantly to the livelihoods of poor households, make up an important part of this production. Fish is, furthermore, an important part of Asian diets. In Bangladesh, Indonesia and the Philippines it comprises 50 percent of animal protein intake, while in Thailand and Vietnam its share is 40 percent. It is the major—and often the only—source of animal protein for the poor. With rising population and demand, expansion of supplies to maintain food security has emerged as a priority concern for developing countries in Asia. However, looming on the horizon are threats to fish supplies and fishery livelihoods such as resource degradation, weak public support and investment, and worsening inequities in global trade. Key questions emerging from this scenario are: given existing trends in supply and demand, what are the prospects for the availability of fish in the future? Is there room for growth in fisheries production, in particular, aquaculture? Can the expansion of trade be sustained? What are the available options for meeting the rising demand and improving livelihoods from fish production? From this set of options, what are the appropriate strategies for increasing and sustaining benefits to poor households from fisheries and aquaculture? This paper reports on the results of 'Fish Supply and Demand in Asia' project, along with policy recommendations and action plans, including assisting poor fish processors, adoption of community based approaches to the management of fisheries, and rural infrastructure development for improved marketing of fish.

Israel, D. and C. Banzon. 1998. Over-fishing in the Philippine Marine Fisheries Sector. Research Report. Singapore: Economy and Environment Program for Southeast Asia

Kurien, J. 1991. Ruining the Commons and Responses of the Commoners: Coastal over-fishing and Fishermen's Actions in Kerala State, India. In Ghai, D. and J.M. Vivian (eds.), 1992. *Grassroots Environmental Action: People's Participation in Sustainable Development*. The United Nations Research Institute for Social Development (UNRISD).

Milazzo, M. 1998. Subsidies in World Fisheries: a Re-examination. Technical Paper 406. Washington, D.C.: World Bank

Rojat, D., S. Rajaosafara, C. Chaboud. 2004. Co-Management of the Shrimp Fishery in Madagascar. IFFET Proceedings, Japan

World Bank, 2004. Saving Fish and Fishers: Toward sustainable and equitable governance of the global fishing sector. Report No. 29090-GLB. Washington, DC: The Agriculture and Rural Development Department, World Bank

<http://siteresources.worldbank.org/INTARD/Resources/SavingFishandFishers.pdf>

Man has taken fish from nature for millennia, and millions still rely on fishing and fish for their income and nutritional quality of their diet. However, without a concerted effort of the global community to improve fisheries management, the world is under imminent threat of a collapse of some of its main fisheries, endangering the livelihoods of these millions, reducing foreign exchange earnings of several developing countries, and ravaging the health of the oceans. Public and international awareness has been raised by an ever increasing stream of evidence that many of the world's fisheries are overfished, catches are declining, and fishers' livelihoods are degrading along with the natural ecosystems they exploit. This Approach paper explores the nature and causes of the fishing crisis before highlighting proven good practices and exploring the potential international support for sustainable fisheries.

WWF. 1998. The Footprint of Distant Water Fleets on World Fisheries. Godalming: WWF

Zanetell, B.A. and B.A. Knuth, 2004. Participation Rhetoric or Community-based Management Reality? Influences on willingness to participate in a Venezuelan freshwater fishery. World Development, Vol. 32, No. 5, pp. 793-807

Can be purchased from <http://www.sciencedirect.com/science/article/B6VC6-4C004XD-1/2/d33faa8162cbf7d320356c286a78bff3>

Community-based management (CBM) has progressed from the conceptual fringe to the dialogical heart of environmental management. Despite its rhetorical popularity, limited quantitative data exist on factors influencing local involvement. A quantitative survey of three Venezuelan fishing villages resulted in a predictive model of willingness to participate in CBM. Sense of community and fishery dependence were significant positive influences. High level of concern about the current and future state of the fishery correlated with an unwillingness to participate, indicating a defeatist attitude about perceived insurmountable problems. We explore sense of community, defeatist attitudes, and education in CBM project formulation and implementation.

4.5 Mining and Minerals

Christian Aid, 2005. Unearthing the Truth: Mining in Peru. A Christian Aid Report.

<http://www.globalpolicy.org/soecon/develop/quality/2005/02peru.pdf>

Using case studies, and legal, economic and environmental data and analysis, this report argues that the benefits increased mining has delivered to the Peruvian economy do not justify the suffering inflicted on poor communities. It documents the legal reforms undertaken by the Peruvian Government to attract foreign capital and examines the costs and benefits of mining at a national and local level. Case studies are presented of the Tintaya copper mine, the smelter and surrounding mines in La Oroya and the rejection by the local community of a proposed mining development in Tambogrande. The analysis conducted by Cooperación in 2000, provided scientific evidence of the extent of pollution in rivers, springs and pastures. High concentrations of contaminants, principally metals, were discovered in water sources in communities close to the mine. Land that had been previously inundated by tailings was found to be highly contaminated, implying risks for use as pasture land. This supports the statements made by the community members to Christian Aid about the impacts of the mine. These include the lack of water for animals and for human consumption, the impact of water pollution on animal health, deterioration in the quality of pasture, decline in fish populations. The report also highlights the adverse health impacts from air pollution for community members living close to the tailings dam.

IIED and WBCSD, 2002. Breaking New Ground: Mining, minerals, and sustainable development - the MMSD Final Report. London: Earthscan Publications Ltd.

Individual chapters can be downloaded from: <http://www.iied.org/mmsd/finalreport/>

This publication includes results of the largest-ever review of mining and minerals. Positive and negative implications to people and to ecosystems are considered. As part of the MMSD

Global initiative, MMSD–North America also offers a strategy for how the industry and others can ensure that mining and minerals contribute positively to society's overall transition to sustainable development.

Chapter 9 Local Communities and Mines

http://www.iied.org/mmsd/mmsd_pdfs/finalreport_09.pdf

This chapter discusses how the environmental impacts of mining affect local communities, citing several case studies or examples, including: high risk of adverse effects of a lead smelter in Mexico City on primary school children living in the vicinity, the alteration of bays and shorelines in Chanaral, Chile where an artificial beach was created by mine waste affected local fishing patterns; and the Marcopper mine accident in the Philippines in which 4 million tonnes of mine tailings poured into the Boac River, destroying aquatic life and affecting 20,000 villagers along the riverbank.

Chapter 13 Artisanal and Small-Scale Mining

http://www.iied.org/mmsd/mmsd_pdfs/finalreport_13.pdf

The vast majority of small-scale miners are very poor exploiting mineral deposits in harsh conditions and with considerable impact on the environment. This chapter argues that many artisanal and small-scale (ASM) activities will disappear naturally if progress is made towards sustainable development as alternative, more attractive employment options become available. "ASM activities will continue for at least as long as poverty drives them". The example of the Sadiola mining site in Mali is highlighted. The mining company introduced a project to help artisanal miners to promote community development and to diversify the local economy. The Sadiola Mining Cooperative was created with technical assistance to miners, community development fund and environmental improvement of mine sites through planting of fruit trees and support for small enterprises. The number of people engaged in ASM has declined rapidly because of the better opportunities provided by trading with workers in the larger mine. Another example cited in this chapter gives more support for the benefits for the poor of investing in the environment but in combination with other measures. In the South of Ecuador, a local NGO, CENDA has worked with 100,000 artisanal miners together with a government agency to develop Plan ECO+ involving a group environmental management plan, technical assistance to miners and a range of social measures eg meals for miners' children. Between 1996 and 1999 the miners adopted more than 200 individual environmental measures. The government subsequently incorporated the concept of joint environmental studies in its mining environmental legislation.

Hentschel, T., Roque, D., and E. Taucer, 2000. Small-scale gold-mining at San Simón, Bolivia. In Jennings, N., 2000 (ed.). Small-scale gold mining: Examples from Bolivia, Philippines and Zimbabwe. Working Paper, Industrial Activities Branch, International Labour Organization.

<http://www.ilo.org/public/english/dialogue/sector/papers/goldmine/>

This study focuses on the San Simón highlands in the Itenez Province, where there are about 500 small-scale miners, producing gold without the required environmental permits. The use of mercury during gold processing has had severe effects on local ecosystems and on the health of the miners. The authors estimate that for each kg of gold produced, 36kg of mercury are emitted to the atmosphere. Only one gold processing plant in the area uses a retort to recover the mercury, the rest burning the amalgam in the open. The processing plants dispose of their tailings in rivers and streams, threatening fish, a major component of the local diet as well as three protected areas in the region. The SDC funded programme MEDMIN has been working in the area to promote cleaner production. Comparisons were made between the current processing approach in San Simón and an alternative approach which would reduce the use of mercury. These showed that gold recovery could be improved with the alternative approach. An agreement was signed between the society of small-scale miners, MEDMIN and Excalibur, a prospecting and exploration company that holds the concession for the area, to tackle the mercury problem. MEDMIN installed a pilot plant in 1998 which demonstrated an increase in gold recovery of 10%, and 10% in cost saving from the reduced use and better recovery of mercury. The investment required for such a plant would be around US\$1,500 but the authors conclude that this can be recouped in a short time.

Keenan, K., J. de Echave and K.Traynor, 2002. Mining and Communities: Poverty amidst wealth. Conference Paper Series No. 3, Political Economy Research Institute and Centre for Science and the Environment. International Conference on Natural Assets, 8-11 January 2003, Tagaytay City, the Philippines.

<http://www.umass.edu/peri/pdfs/CDP3.pdf>

This paper discusses the costs and benefits of mining activity, drawing on the experience of Cooperación, a Peruvian NGO that works with communities affected by commercial mining activity, and the Canadian Environmental Law Association, a legal aid clinic in the province of Ontario. The case of La Oroya is presented (see also Christian Aid 2005). La Oroya has been an important mining centre since 1919 when a metal smelter was built. It is now considered to be one of the most environmentally threatened areas of Peru, with both rural and urban settlements adversely affected by mining activities. Local residents demanded that the area be cleaned up. A coalition of NGOs, the Union for Sustainable Development Consortium (UNES) has been working with affected communities to develop local capacity in environmental monitoring and management. The aim is to generate scientifically credible data that the community can use to pressure for change. The first phase involved an environmental assessment and development of an environmental recovery plan. The environmental assessments showed that local air, soil and water resources are seriously polluted. A study of children and expectant mothers revealed dangerously high levels of lead in their blood. The current phase involves work on the rehabilitation of natural resources, including water sources and grazing lands.

McMahon, G., E.R. Subdibjo, J. Aden, A. Bouzاهر, G. Dore and R. Kunanayagam, 2000. Mining and the Environment in Indonesia: Long-term trends and repercussions of the Asian economic crisis. EASES Discussion Paper Series, World Bank

http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2001/01/06/000094946_00121605340721/Rendered/PDF/multi_page.pdf

The study focuses on the potential environmental impacts of the economic crisis in the mining sector in Indonesia. The pre-crisis and current situation of large-scale mines are reviewed, drawing on existing studies and statistics, similarly for medium-scale mines. The mining sector's substantial financial contribution to the economy (over US\$5 billion annually) comes with substantial environmental costs some of which are yet to be well-identified and well understood. A lower bound estimate of environmental damage cost, based on environmental expenditures and land reclamation costs (spread over 10 years with a discount rate of 12%) comes to US\$0.5 billion. The environmental impact of the mining sector in Indonesia, before the economic crisis was not considered substantial. The crisis brought about changes in mining with environmental implications. Small-scale gold mining is also associated with considerable environmental damage, primarily due to the use of mercury, most of which is discarded. All the community leaders interviewed reported environmental damage due to the mining activity. Nevertheless, they were supportive of mining, considering the increased incomes from mining to be more than adequate compensation for the environmental and social problems associated with mining. The authors conclude that in both given local residents' low income levels and lack of prior exposure to mining environmental damage, short-term economic rationality prevailed. They stress the need for communities to be made aware of the long-term environmental consequences of mining activities for sustainable multiple use of local natural resources.

Render, J.M., 2005. Mining and Indigenous Peoples Issues Review. Prepared for the International Council on Mining and Metals.

<http://www.icmm.com/publications/763IPReport.pdf>

Relationships between mining and metals operations and their local communities are often complex. This is particularly the case in relationships with Indigenous communities, which have characteristics that set them apart from the wider community. While industry, Indigenous peoples, governments and other stakeholders all have a role to play in ensuring sustainable communities, ICMM has recognised the need to facilitate more meaningful industry engagement with Indigenous peoples. As a result, this independent review of the issues surrounding Indigenous peoples and mining and metals operations was commissioned of a diverse range of industry representatives, as well as non-industry views from a variety of sources. The review identifies a high level of convergence in the issues identified by industry, Indigenous peoples and other stakeholders and outlines a number of possible follow-up activities. It finds however, that there is a gap between how industry respondents perceive the linkages between indigenous peoples' issues and how others perceive them. Some industry respondents felt that debate and conflict over environmental issues in indigenous territories was being driven by external actors and that they perceived indigenous people to be more interested in economic concerns than the environment. The report argues that these industry views do not capture how indigenous peoples and their organisations have tried to shape the dialogue on mining and environmental practices. While there are cases of conflict between environmental conservation NGOs and indigenous peoples, it is argued that there

are just as many cases where indigenous peoples create alliances with environmental NGOs to build their own capacity to campaign against activities that go against their conceptions of stewardship of the environment. The review notes that indigenous organisations also point out that the mining industry typically separates environmental issues into one technical basket and indigenous issues into another, whereas indigenous peoples and NGOs have historically merged the two.

5. Economic incentives

This section contains references on the following issues:

- Discount rates
- Market-based instruments, including Payments for Ecosystem Services
- Valuation of environmental resources
- Subsidies.

5.1 Discount rates and time preference

Anderson, C., M. Dietz, A. Gordon and M. Klawitter. 2004. Discount rates in Vietnam. *Economic Development and Cultural Change*. 52(4): 873-888

Can be downloaded from <http://courses.washington.edu/pbafadv/vietnam%20DR.pdf>

Discount rates, the rates at which individuals are willing to trade current for future consumption, are not constant overtime, with individuals revealing “present-biased preferences”. The authors are interested in the robustness of discount rate patterns and how they vary with demographic characteristics. In this article, they examine whether time-inconsistent discount rate patterns hold in Vietnam, and recommend policy implications of their findings.

Cuesta, M., Carlson, G. and E. Lutz, 1997. An Empirical Assessment of Farmers' Discount Rates in Costa Rica and its Implications for Soil Conservation. Mimeo. Washington, D.C.: World Bank

Holden, S., B. Shiferaw and M Wik. 1998. Poverty, market imperfections and time preferences: of relevance for environmental policy? *Environment and Development Economics*. 3:105-30

http://journals.cambridge.org/article_S1355770X98000060

Rates of time preference (RTPs) of rural households in Indonesia, Zambia and Ethiopia have been measured using hypothetical questions about preferences for current versus future consumption. In general, the rates were found to be very high. Factors influencing or correlated with the personal rates of time preference were investigated through regression methods. OLS was the technique used in the estimation. Market imperfections, particularly in credit and insurance markets lead to variation in RTPs. Poverty in assets, or cash liquidity constraints, was leading to or correlated with higher rates of time preference. The poor are, therefore, less likely to invest in environmental conservation. In Zambia, independent estimates of risk preferences were made. More risk-averse people tended to have lower RTPs. The results support the hypothesis that poverty and/or liquidity scarcity lead to high RTPs. Poverty reduction may thus reduce the RTPs of the poor and reduce the ‘intertemporal externality’ due to high RTPs. The high average RTPs indicate, however, that complementary policies may be needed to ensure sufficient levels of investment in conservation. Another logical implication is that institutionalization of private property rights may not be a sufficient tool to initiate sustainable resource management.

Markandya, A. and Pearce, D. W. 1991. Development, environment and the social rate of discount, *World Bank Research Observer*, 6, 2, 137-152.

Can be purchased from <http://wbro.oxfordjournals.org/cgi/content/abstract/6/2/137>

This article examines the role of the discount rate in making decisions that will have significant implications for the environment. The authors begin by providing a rationale for discounting in general and by describing the main factors that determine the discount rate. These factors—the private and social rates of time preference, the opportunity cost of capital, risk and uncertainty, and the interests of future generations—all have an environmental dimension. The article goes on to examine that dimension and to explore the connections between the choice of the discount rate and environmental concerns, such as excessive exploitation of natural resources, inadequate investment in conservation, and insufficient attention to the irreversible

loss of certain environmental resources. The authors conclude that, in general, environmental concerns are not best addressed by lowering the discount rate—an action that might have both benefits and costs for the environment. A more promising course would be to incorporate a criterion of sustainability into certain aspects of decision-making. How such a criterion could be made operational is touched upon but not developed in this article.

Moseley, W. 2001. African evidence on the relation of poverty, time preference and the environment. *Ecological Economics*. 38: 317-326

Can be purchased from <http://www.sciencedirect.com/science/article/B6VDY-43T1TTR-2/2/4f89aa707e1ef4b1c318ea62a010a86e>

It is typically argued in the economics literature that the poor operate with a higher rate of time preference than their wealthier counterparts. The poor, it is suggested, have a higher rate of time preference because they are more concerned about present survival than they are about saving for the future. Such thinking is also central to the economic growth for environmental conservation and the poverty induced environmental degradation arguments. According to these assertions, wealth allows people to consider the future and invest in environmental conservation; and poverty leaves people with no alternative but to exploit the environment so that they may feed their families today. Evidence from the food security and famine early warning fields suggests that households in many African contexts behave quite to the contrary. During periods of food shortage, poor households will often undertake extreme measures in the present, including depriving the family of needed calories, in order to preserve productive capital for the future, such as a plough, oxen or seed stock. This evidence suggests that poor African households may, in fact, have very low rates of time preference. This calls into question our general assumptions about discount rates for developing countries, for which rates of time preference are a theoretical determinant.

Poulos, C. and Whittington, D. 2000. Time preferences for life-saving programs: evidence from six less developed countries. *Environmental Science and Technology*. 34:1445-1455

Can be purchased from:

<http://pubs.acs.org/cgi-bin/abstract.cgi/esthag/2000/34/i08/abs/es990730a.html>

Individuals' time preferences for saving lives are measured in six less developed countries in Africa, Eastern Europe, and Asia using a stated-preference method. The results indicate that individuals' discount rates differ significantly by country, but they are much higher than those estimated for samples in the United States and Western Europe. Also, respondents' time preferences for saving lives are characterized by a nonconstant exponential discount function. We conclude that the discounting practices currently used in standard economic analyses of development projects are poor representations of individuals' actual time preferences.

5.2 Market-based instruments, including Payments for Ecosystem Services

Balmford, A. and T. Whitten. 2003. Who should pay for tropical conservation, and how could the costs be met? *Oryx*. 37(2): 238-250

http://journals.cambridge.org/article_S0030605303000413

While conservation activities are under-funded almost everywhere, the gap between current expenditure and what is needed is particularly extreme in the tropics where threatened species and habitats are most concentrated. We examine how to bridge this funding gap. Firstly, we try to identify who in principle should pay, by comparing the spatial distribution of the costs and benefits of tropical conservation. The immediate opportunity costs of conservations often exceed its more obvious, management-related costs, and are borne largely by local communities. Conversely, we argue that the greatest benefits of conservation derives from ecological services, and from options, existence, and bequest values; these are often widely dispersed and enjoyed in large part by wealthier national and global communities, who receive most benefit but currently pay least cost. In the second part of the paper we review recent developments in order to examine how in practice increased funding may be raised. There are many growing and novel sources of support: private philanthropy, premium pricing for biodiversity-related goods via certification schemes, and the development of entirely new markets for environmental services. Despite their potential, we conclude that the principal route for meeting the unmet costs of tropical conservation will have to be via governments, and will inevitable require the transfer of substantial resources from north to south. This will be enormously difficult, both politically and logistically but without it we believe that much of what remains of tropical nature will be lost.

Engel, S. and C. Palmer. 2005. Designing Payments for Environmental Services in the Context of Weak Property Rights and Commercial Interests. Center for Development Research. Bonn: University of Bonn

Ferraro, P. and A. Kiss. 2002. Direct payments to conserve biodiversity. *Science*. 298: 1718-9
http://www.cciforum.org/pdfs/Ferraro_Kiss_2002.pdf

The international community has invested billions of dollars to stem the loss of biodiversity in developing nations. Despite these investments, the loss continues. Biodiversity is a public good and thus is not supplied in sufficient quantities by individuals acting in their own self-interest. Conservation practitioners try to provide individuals who destroy ecosystems and species with incentives to preserve them. These incentives lie on a spectrum from indirect to direct with respect to their link with conservation objectives. Conservation initiatives in the United States, Australia, and most of Europe increasingly emphasize more direct incentives where as conservation in developing nations has emphasized the more indirect end of the spectrum. These kinds of efforts have been referred to as "conservation by distraction". This paper briefly outlines indirect and direct approaches and future prospects, concluding that the conservation community must reconsider its attempts to provide biodiversity through indirect means. If we want to get what we pay for, we must start tying our investments directly to our goals.

Gutman, P. (ed.). 2003. From Goodwill to Payments for Environmental Services. A Survey of Financing Options for Sustainable Natural Resource Management in Developing Countries. Gland: World Wildlife Fund

Can be downloaded from:

http://assets.panda.org/downloads/fin_alt.pdf?bcsi_scan_EC783A0C3C997A81=0&bcsi_scan_filename=fin_alt.pdf (3.5MB)

The report provides a user-friendly entry point to 52 financing options for sustainable natural resource management (SNRM), together with clear indications of where to go next, either for more in-depth information and analysis, or to contact people from the financing sources themselves. There is also a brief discussion and description that highlights which financing options might be more accessible to poor rural communities, or offer more opportunities for projects and programs to simultaneously address rural livelihood improvements and natural resources conservation. A summary of ongoing experiences and discussions regarding financing SNRM through payments for environmental services (PES) and private business-community partnerships, which have recently attracted much attention but whose potentials and limitations are still a matter of debate is given. Finally, a collection of recent SNRM financing cases and experiences are presented.

Heal, G. 2000. Nature and the Marketplace. Capturing the Value of Ecosystem Services. Washington, D.C.: Island Press

Keppler, H. and H. Mountford. 1999. Handbook of Incentive Measures for Biodiversity: Design and Implementation. Paris: OECD

Miranda, M., I. Porras and M. Moreno. 2003. The Social Impacts of Payments for Environmental Services in Costa Rica. London: IIED
<http://www.rlc.fao.org/foro/psa/pdf/social.pdf>

When Costa Rica set up its Payments for Environmental Services (PES) programme in 1995, it was widely praised for pioneering global efforts to introduce compensation systems for environmental services. The programme seeks to encourage forest protection and management by paying forest owners for four environmental services provided by their forests: carbon, biodiversity, watershed management, and landscape beauty. Although the PES scheme is not a social welfare programme, from the outset the state and various social organisations assumed that it would contribute to rural poverty alleviation in Costa Rica. It became apparent that the programme was indeed having an impact on the quality of life of communities and individuals in rural areas. However, little was known about the impact on the poorer sections of the population. The aim of this study was to look at the impacts the PES programme has on poverty and other social factors, using as a basis for the analysis the *Sustainable Livelihoods Framework*, and examining the effects the programme has on financial, human, social, physical and environmental assets. The result is an analysis of the social effects of the PES in the Central Volcanic Mountain Range Conservation Area (ACCVC), with a particular focus on the Virilla watershed.

OECD/WGEAB 2003. Perverse Incentives in Biodiversity Loss. Paris: Working Group on Economic Aspects of Biodiversity, OECD

<http://www.oecd.org/dataoecd/50/17/19819811.pdf>

Governments use incentive measures in a variety of public policy contexts to achieve socially desirable outcomes as efficiently as possible. In many instances, however, those incentives will have unforeseen consequences — some of which may be harmful; i.e. are “perverse”. Policies that have perverse consequences — whether at their inception or subsequently — are generally welfare reducing and should be reformed. The policy context in which to undertake the reform poses some analytical challenges. Since all economies have numerous policy instruments already in place, the discussion of perverse incentives must occur within a “second-best” policy setting. This document looks at some areas where policies have perverse impacts on biodiversity and suggests approaches for how a reform may be undertaken with the goal of ensuring welfare improvements. In so doing, it focuses on government subsidies that cause damage to biodiversity. The messages, however, can also be applied to non-subsidy incentives that affect biodiversity.

Pagiola, S., A. Arcenas and G. Platais. 2005. Can payments for environmental services help reduce poverty? An exploration of the issues and the evidence to date from Latin America. *World Development*. 33 (2): 237-253

Can be purchased from <http://www.sciencedirect.com/science/article/B6VC6-4F9735C-6/2/c61cac6dd8741c870c8c1f216fec5dd2>

This paper examines the main ways in which Payments for Environmental Services (PES) might affect poverty. PES may reduce poverty mainly by making payments to poor natural resource managers in upper watersheds. The extent of the impact depends on how many PES participants are in fact poor, on the poor's ability to participate, and on the amounts paid. Although PES programs are not designed for poverty reduction, there can be important synergies when program design is well thought out and local conditions are favorable. Possible adverse effects can occur where property rights are insecure or if PES programs encourage less labor-intensive practices.

Pearce, D. W. 2004. Environmental market creation: saviour or oversell? *Portuguese Economic Journal* 3 (2): 115-144

Can be purchased from <http://www.springerlink.com/>

In recent years considerable attention has been paid to the notion of ‘market creation’ for the conservation of environmental assets. Market creation establishes a market in the external benefit or cost in question (e.g. biodiversity or pollution reduction) and leaves the relevant parties to adjust their behaviour accordingly. While most attention has been paid to market creation through tradable permits and taxes (the ‘polluter-pays’), it is less easy to secure a perspective on ‘beneficiary-pays’ initiatives. Both polluter-pays and beneficiary-pays initiatives are examples of modified Coaseian bargains in which governments intervene in the bargains to lower transactions costs, establish property rights, deal with public goods issues, or act on behalf of disadvantaged groups. This paper reviews four major initiatives in this respect - debt-for-nature swaps, bioprospecting and the Global Environment Facility at the global level, and the Costa Rican Forest Law at the local level. It finds that while there is much to applaud in initiatives in these new markets, serious questions remain about the modest flows of funds associated with such ‘global bargains’, and the extent to which they secure environmental improvements relative to the baseline of business-as-usual.

Pearce, D. W. 2005. Conceptual framework for analyzing the distributive impacts of environmental policies. In Y.Serret and N. Johnstone (eds). Environmental Policy and Distributional Issues. Cheltenham: Edward Elgar and OECD.

<http://www.ucl.ac.uk/~uctpa36/oecd%20distribution.pdf>

The purpose of this report is to provide a general conceptual framework for the analysis of the socio-economic distribution of environmental bads and goods. This framework requires not only the setting up of hypotheses about the existing distribution of environmental quality, but also a model to explain why that distribution comes about. Using this framework we then analyse the available empirical literature to see what evidence can be adduced for the hypotheses that the existing distribution of environmental bads is regressive - the ‘environmental injustice hypothesis’. Second, we look at the evidence on the distribution of benefits from environmental policies. In this case there are no *a priori* expectations about the distribution of benefits: they may be progressive or regressive. Third, we investigate the relevance of accounting for the distribution of cost burdens along with the distribution of

benefits of policies - the issue is whether it is the gross or net benefit (benefit minus cost) incidence that matters for policy. Fourth, we look at the issue of distribution from another perspective, namely whether the demand for environmental quality is 'income elastic' or not. If it is income elastic, the suggestion would be that improvements in environmental quality will tend to be biased towards higher income groups since they demand more of it. Finally, policy issues are addressed with the aim of seeing how far pursuit of equality of environmental endowments is consistent with efficient environmental and economic goals.

Pearce, D. W. 2006. Do we really care about biodiversity? In A. Kontoleon, U. Pascuale and T. Swanson (eds). Handbook of Biodiversity Economics. Cambridge: Cambridge University Press.

Rojas, M. and B. Aylward. 2003. What Are We Learning from Experiences with Markets for Environmental Services in Costa Rica? London: IIED

<http://www.rlc.fao.org/foro/psa/pdf/learning.pdf>

The use of markets and payments for environmental services is a topic gaining interest among policy-makers and practitioners worldwide. In the developing world, Costa Rica has led efforts to experiment with the application of these mechanisms. This paper examines the literature regarding the Costa Rica experience to see what we are learning - how technical, scientific and economic information on environmental services has fed into these initiative, and to what extent these experiences are being monitored and evaluated. The principal objective of the literature review is to identify and review material that addresses inter alia the local origins and development of the concept of payments and markets of environmental services, the types of existing initiatives and who is participating in them, the knowledge base underpinning market development, the monitoring and evaluation of the initiatives to date and to what extent the literature assesses these initiatives in terms of economic efficiency, environmental effectiveness, and social equity and/or poverty reduction.

Rosa, H., S. Kandel and L. Dimas. 2003. Compensation for Environmental Services and Rural Communities: Lessons from the Americas and Key Issues for Strengthening Community Strategies. San Salvador: PRISMA

http://www.prisma.org.sv/pubs/CES_RC_En.pdf

This report explores the concept of payment for ecosystem services around the world, and their effect of reducing social inequity and environmental degradation. The authors explore if payment for ecosystem services can help to overcome imbalances in access, control, and benefits from natural resources. Analyses of case studies from Costa Rica, Mexico, Brazil, El Salvador and New York are presented.

Ruiz-Pérez, M., et al. 2004. Markets Drive the Specialization Strategies of Forest Peoples. Ecology and Society, Vol. 9(2): 4

<http://www.cifor.cgiar.org/publications/ntfbsite/pdf/MarketDrive.pdf>

Engagement in the market changes the opportunities and strategies of forest-related peoples. Efforts to support rural development need to better understand the potential importance of markets and the way people respond to them. To this end, we compared 61 case studies of the commercial production and trade of nontimber forest products from Asia, Africa, and Latin America. The results show that product use is shaped by local markets and institutions, resource abundance, and the relative level of development. Larger regional patterns are also important. High-value products tend to be managed intensively by specialized producers and yield substantially higher incomes than those generated by the less specialized producers of less managed, low-value products. We conclude that commercial trade drives a process of intensified production and household specialization among forest peoples.

Serret, Y. and N. Johnstone (eds). 2006. Environmental Policy and Distributional Issues. Cheltenham: Edward Elgar and OECD

Simpson, D. 2004. Conserving Biodiversity through Markets: a Better Approach. PERC Policy Series P32. Montana: Property and Environment Research Center

<http://www.perc.org/pdf/ps32.pdf>

International conservation groups have recognized the value of markets as a way to address habitat conservation, and this recognition has led many to support market activities intended to preserve habitat in its "natural" or pristine state. Integrated Conservation and Development Projects or ICDPs that combine conservation and development through such activities as ecotourism, forest product collection and marketing, and pharmaceutical research on natural organisms are one example. This paper will clarify the reasons why it appears to be failing and

why straightforward purchase of biodiversity conservation is a more cost-effective approach. It will then address pragmatic issues surrounding the purchase of habitat in tropical countries, including cost, and explore the degree to which *real* markets for conservation—payments for habitat conservation per se—are practicable.

Ten Kate, K. and Laird, S. 1999. *The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit-Sharing*. London: Earthscan

World Bank 1994b. *Chile: Managing Environmental Problems – Economic Analysis of Selected Issues*. Report 13061-CH. Washington, D.C.: World Bank

Wunder, S. 2005. Payments for Environmental Services: Some Nuts and Bolts. Occasional Paper 42. Bogor: CIFOR

http://www.cifor.cgiar.org/publications/pdf_files/OccPapers/OP-42.pdf

This paper aims to help demystify Payments for Environmental Services (PES) for non-economists, starting with a simple and coherent definition of the term. It then provides practical 'how-to' hints for PES design. It considers the likely niche for PES in the portfolio of conservation approaches. This assessment is based on a literature review, combined with field observations from research in Latin America and Asia. It concludes that service users will continue to drive PES, but their willingness to pay will only rise if schemes can demonstrate clear additionality vis-à-vis carefully established baselines, if trust-building processes with service providers are sustained, and PES recipients' livelihood dynamics is better understood. PES best suits intermediate and/or projected threat scenarios, often in marginal lands with moderate conservation opportunity costs. People facing credible but medium-sized environmental degradation are more likely to become PES recipients than those living in relative harmony with Nature. PES is a highly promising conservation approach that can benefit buyers, sellers and improve the resource base, but it is unlikely to completely outstrip other conservation instruments.

Yaron, G. 2002. The economic value of Mount Cameroon: alternative land use options. In D. W Pearce, C. Pearce and C. Palmer (eds). *Valuing the Environment in Developing Countries: Case Studies*. Cheltenham: Edward Elgar: 406-446

Zbinden, S. and D. Lee. 2005. Paying for environmental services: An analysis of participation in Costa Rica's PSA program. World Development. 33 (2): 255-272

<http://edcintl.cr.usgs.gov/SEMSOC/uploads/File/ZbindenLee.pdf>

Costa Rica has long been a leader among developing countries in the design of and experimentation with innovative environmental programs. Since 1997, Costa Rica's "Pagos de Servicios Ambientales" (Payments for Environmental Services) Program has provided payments to more than 4,400 farmers and forest owners for reforestation, forest conservation, and sustainable forest management activities. Econometric analysis of a survey of farmers and forest owners, including both PSA participants and nonparticipants, shows that farm size, human capital and household economic factors, and information variables significantly influence participation in PSA program alternatives. Large farmers and forest owners are disproportionately represented among program participants.

5.3 Valuation of environmental resources

Balmford, A., A. Bruner., P. Cooper., R. Costanza., S. Farber., R. Green., M. Jenkins., P. Jefferiss., V. Jessamy., J. Madden., K. Munro., N. Myers., S. Naeem., J. Paavaola., M. Rayment., S. Rosendo., J. Roughgarden., K. Trumper and R. Turner. 2002. Economic reasons for conserving wild nature. *Science*. 297: 950-3 139

Can be purchased from <http://www.sciencemag.org/cgi/content/abstract/297/5583/950>

On the eve of the World Summit on Sustainable Development, it is timely to assess progress over the 10 years since its predecessor in Rio de Janeiro. Loss and degradation of remaining natural habitats has continued largely unabated. However, evidence has been accumulating that such systems generate marked economic benefits, which the available data suggest exceed those obtained from continued habitat conversion. We estimate that the overall benefit:cost ratio of an effective global program for the conservation of remaining wild nature is at least 100:1.

Billor, D. and R. Bark. 2001. Valuation of Biodiversity Benefits: Selected Studies. Paris: OECD

http://www.brc.re.kr/pdf/benefits.pdf?bcsi_scan_EC783A0C3C997A81=0&bcsi_scan_filename=benefits.pdf

Environmental problems in general and biodiversity degradation in particular are related to the failure of markets to properly value environmental services and regulate their use. Valuation methods are thus needed to assist policy makers in identifying priorities and evaluating trade-offs. The importance of valuation is widely understood in academia and is increasing in policy making and other fora. For example, the Convention on Biological Diversity (CBD), through the Conference of the Parties (COP), recognises that “economic valuation of biodiversity and biological resources is an important tool for well-targeted and calibrated economic incentive measures”. Furthermore, it encourages the Parties to “take into account economic, social, cultural and ethical valuation in the development of relevant incentive measures” (CBD COP Decision IV/10). The menu of valuation techniques is vast and draws on several disciplines, with economics playing a major role.

Bockstael, N., A. M. Freeman., R. Kopp, P. Portney and V. K. Smith. 2000. On valuing Nature. *Journal of Environmental Science and Technology*. 34 (8): 1384-9

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

http://www.esd.ornl.gov/benefits_conference/nature_paper.pdf

The services of ecological systems and the natural capital stocks that produce them are critical to the functioning of the Earth’s life-support system. They contribute to human welfare, both directly and indirectly, and therefore represent part of the total economic value of the planet. We have estimated the current economic value of 17 ecosystem services for 16 biomes, based on published studies and a few original calculations. For the entire biosphere, the value (most of which is outside the market) is estimated to be in the range of US\$16–54 trillion (1012) per year, with an average of US\$33trillion per year. Because of the nature of the uncertainties, this must be considered a minimum estimate. Global gross national product total is around US\$18 trillion per year.

EFTEC. 2005. The Economic, Social and Ecological Value of Ecosystem Services: a Literature Review. London: DEFRA.

Can be downloaded from <http://statistics.defra.gov.uk/esg/reports/ecosystem/default.Asp>

Driving forces behind ecosystem degradation are many and interlinked. In addition, our limited capacity to deal with the potentially catastrophic consequences of ecosystem degradation is exacerbated by the lack of adequate information and knowledge about ecosystem functions and the benefits they generate for society. The main objective of this study is to showcase the current evidence base for the benefits of ecosystem goods and services. In achieving this objective, our focus has been on those goods and services about which there is no readily available data from markets. The report also provides a framework which links ecosystems to their goods and services and resulting benefits to society. This framework can enable better decision-making for ecosystem use, by demonstrating the full economic costs implicit in trade-offs between development and preservation of ecosystems. Better information on its own will not bring about sustainable use of ecosystems, achievable only if this information is then used to address the drivers of ecosystem degradation. Examples of measures capable of ‘capturing’ demonstrated value include payments for provision of ecosystem services, creation of markets for ecosystem services where they do not already exist, improving the property rights system, enhancing the assets of the poor, improving the quality of economic growth, reforming international and industrial country policies and improving governance. This report and its annexes are only able to touch upon these measures, which are the subject of entire books.

Emerton. 2000c. Mount Kenya: The Economics of Community Conservation. Paper No. 6. Institute for Development Policy and Management. Community Conservation Research in Africa: Principles and Comparative Practice. Manchester: University of Manchester

Hamilton, K. and Hartwick, J. 2005. Investing exhaustible resource rents and the path of consumption. *Canadian Journal of Economics*. 38(2): 615-21

Can be purchased from <http://www.blackwell-synergy.com/doi/abs/10.1111/j.0008-4085.2005.00295.x>

We set out dollar-valued net national product for an economy with a wasting essential stock (oil deposit). We take up ‘maintaining capital intact’ and locally unchanging consumption. The

percentage change in 'net investment' or 'genuine savings,' relative to the market rate of interest, denotes whether current consumption is rising, constant, or declining.

Heal, G., E. Barbier, K Boyle, A. Covich, S. Gloss, C. Hershner, J. Hoehn, C. Pringle, S. Polasky, K. Segerson and K. Schrader-Frechette. 2005. Valuing Ecosystem Services: Towards Better Environmental Decision-making. Washington, D.C.: National Academies Press
http://dels.nas.edu/dels/rpt_briefs/valuing_services_final.pdf

Until the economic value of ecosystem goods and services is acknowledged in environmental decision-making, they will implicitly be assigned a value of zero in cost-benefit analyses, and policy choices will be biased against conservation. This report identifies methods for assigning economic value to ecosystem services—even intangible ones—and calls for greater collaboration between ecologists and economists in such efforts.

Lange, G. -M., R. Hassan and K. Hamilton. 2003. Environmental Accounting in Action: Case Studies from Southern Africa. Cheltenham: Edward Elgar

Can be purchased from <http://www.columbia.edu/~gl2134/Lange%20Environ%20Acc%20flyer.pdf>

This book studies the experiences of Namibia, Botswana and South Africa, the core countries of a unique, regional environmental accounting programme in Southern Africa. Covering minerals, forestry, fisheries and water, each chapter provides important lessons about sustainable resource management. As a whole, the case studies demonstrate how to overcome the many challenges of constructing environmental accounts and the mechanics of successful implementation. By providing a transparent system of information about the relationship between human activities and the environment, the accounts have improved policy dialogue among different stakeholders and have played a significant role in environmental policy design.

Nordhaus, W. and others. 1999. Nature's Numbers: Expanding the National Economic Accounts to Include the Environment. Washington, D.C.: National Academy Press

Norton-Griffiths, M. and C. Southey. 1995. The opportunity costs of biodiversity conservation in Kenya. Ecological Economics. 12: 125-139

Pagiola, S., K von Ritter and J Bishop. 2004b. Assessing the Economic Value of Ecosystem Conservation. Environment Department Paper 101. Environment Department. Washington, D.C.: World Bank

<http://www.un.org/Depts/dhl/environment/toc/toc5.pdf>

Valuation is not a single activity, and the seemingly simple question 'how valuable is an ecosystem?' can be interpreted in many different ways. It could be interpreted as asking about the value of the current flow of benefits provided by that ecosystem, for example, or about the value of future flows of benefits. It could also be asking about the value of conserving that ecosystem rather than converting it to some other use. These interpretations of the question are often treated as being synonymous, but they are in fact very different questions, and the answer to one will not be correct as an answer to the other. This paper seeks to clarify how valuation should be conducted to answer specific policy questions. In particular, it looks at how valuation should be used to examine four distinct aspects of the value of ecosystems: determining the value of the total flow of benefits from ecosystems; determining the net benefits of interventions that alter ecosystem conditions; examining how the costs and benefits of ecosystems are distributed; and identifying potential financing sources for conservation.

Pearce, D. W. 1998. Auditing the Earth. Environment. 40, 2, March. 23-28

Pearce, D. W. 2000. Cost benefit analysis and environmental policy, in D. Helm (ed), Environmental Policy: Objectives, Instruments and Implementation, Oxford: Oxford University Press, 48-74

Pearce, D. W. 2004. The economic value of biodiversity. In A. T. Bull (ed), Microbial Diversity and Bioprospecting. Washington, D.C.: ASM Press: 469-475

Pearce, D.W., C. Pearce and C Palmer (eds). 2002. Valuing the Environment in Developing Countries: Case Studies. Cheltenham: Edward Elgar (Not available on the web).

The substantial and growing interest in the monetary valuation of preferences for environmental improvement, and against environmental damage, has prompted a demand for case studies illustrating methodologies and applications of valuation techniques. In this, the first of two volumes, the authors provide detailed case studies of valuation techniques that

have been used in developing countries. They demonstrate that valuation works and that it can yield significant insights into policy-relevant issues regarding conservation and economic development. The authors address a whole range of environmental issues under the broad themes of water and air quality, biological diversity and forest functions. The economic approaches covered include contingent valuation, hedonic property prices, travel cost methodologies and benefits transfer. They also go on to look at the idea of extending national accounts to reflect changes in environmental assets. Examples of the varied and interesting case studies include valuing improvements to sanitation in Malaysia, the value of visits to game parks in South Africa and tropical forest values in Mexico. They highlight how valuation techniques can be applied, often with limited resources, to critical development issues.

Pearce, D.W., D Moran and D. Biller. 2002. Handbook of Biodiversity Valuation: A guide for Policymakers. Paris: OECD

Can be purchased from <http://www.oecdbookshop.org/>

This handbook focuses on the nature of values associated to biological diversity (biodiversity) and the methodological approaches that can be adopted to assign values for policy purposes. It adopts a variety of case studies to illustrate the valuation process in OECD countries. This report emphasises the need to assign value to biodiversity as a prerequisite to an efficient approach to resource allocation. Biodiversity is a scarce and valuable global resource and conservation decisions must be taken to maximise this value within inescapable budget constraints. The volume is mainly though not exclusively concerned with the economic valuation of biodiversity. The importance of economic valuation is recognised in the CBD context. CBD's Conference of the Parties (COP) Decision IV/10 acknowledges that "economic valuation of biodiversity and biological resources is an important tool for well-targeted and calibrated economic incentive measures", and encourages the Parties to "take into account economic, social, cultural, and ethical valuation in the development of relevant incentive measures". While there are exceptions to the need to prioritise economic values over other cultural, traditional and spiritual values, the area of economic valuation has a sound theoretical foundation that can help clarify the tradeoffs implicit in public policy. Nevertheless, this volume does signal the limitations of an economic approach and considers how economic and non-economic values are related and can be reconciled.

Pearce, D.W., G. Atkinson and S. Mourato. 2006. Cost-Benefit Analysis and the Environment: Recent Developments. Paris: OECD

Executive Summary available from: <http://www.oecd.org/dataoecd/37/53/36190261.pdf>

Environmental protection is now an integral part of public policies, at local, national and global levels. In all instances, the cost and benefits of policies and projects must be carefully weighed using a common monetary measuring rod. Yet, many different categories of benefits and cost must be evaluated, such as health impacts, property damage, ecosystem losses and other welfare effects. Furthermore, many of these benefits or damages occur over the long term, sometimes over several generations, or are irreversible (e.g. global warming, biodiversity losses). How can we evaluate these elements and give them a monetary value? How should we take into account impacts on future generations and of irreversible losses? How to deal with equity and sustainability issues? This book presents an in-depth assessment of the most recent conceptual and methodological developments in this area. It examines how costs and benefits are evaluated and given monetary value, how to take into account impacts on future generations and impacts of irreversible losses, and how to deal with equity and sustainability issues.

Rausser, G. and Small, A. 2000. Valuing research leads: bioprospecting and the conservation of genetic resources. Journal of Political Economy. 108 (1):173-206

<http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1022&context=blewp>

Bioprospecting has been touted as a source of finance for biodiversity conservation. Recent work has suggested that the bioprospecting value of the "marginal unit" of genetic resources is likely to be vanishingly small, creating essentially no conservation incentive. This result is shown to flow specifically from a stylized description of the research process as one of brute-force testing, unaided by an organizing scientific framework. Scientific models channel research effort towards leads for which the expected productivity of discoveries is highest. Leads of unusual promise then command information rents, associated with their role in reducing the costs of search. When genetic materials are abundant, information rents are virtually unaffected by increases in the profitability of product discovery, and decline as technology improvements lower search costs. Numerical simulation results suggest that,

under plausible conditions, the bioprospecting value of certain genetic resources could be large enough to support market-based conservation of biodiversity.

Silva, P. and Pagiola, S. 2003. A Review of the Valuation of Environmental Costs and Benefits in World Bank Projects. Environment Department. Washington, D.C.: World Bank

Simpson, D., Sedjo, R. and Reid, J. 1996. Valuing biodiversity for use in pharmaceutical research. *Journal of Political Economy*. 104(1): 163-185

Toman, M. 1998. Why not to calculate the value of the world's ecosystems and natural capital. *Ecological Economics* 25: 57-60

Turner, R.K., J. Pavavola., P. Cooper., S. Farber., V. Jessamy and S. Georgiou. 2003. Valuing nature: lessons learned and future research directions. *Ecological Economics*. 46: 493-510

<http://edcintl.cr.usgs.gov/SEMSOC/uploads/File/Turner%20et%20al2003.pdf>

The main objective of this review is to assess the policy relevance of the information encompassed by the wide range of valuation studies that have been undertaken so far. Published and other studies now cover most ecosystems, with aquatic and marine contexts attracting the least attention. There is also a predominance of single function valuation studies. Studies valuing multiple functions and uses, and studies which seek to capture the 'before and after' states as environmental changes take place, are rare. By and large it is the latter types of analyses that are most important as aids to more rational decision taking in ecosystem conservation versus development situations involving different stakeholders (local, national and global). Aggregate (global scale) estimates of ecosystems value are problematic, given the fact that only 'marginal' values are consistent with conventional decision-aiding tools such as economic cost-benefit analysis. In general, valuation data provide prima facie support for the hypothesis that net ecosystem service value diminishes with biodiversity and ecosystem loss.

5.4 Subsidies

Anderson, K., B. Dimaranan, J.Francois, T.Hertel, B.Hoekman and W.Martin. 2001. The cost of rich (and poor) country protection to developing countries. *Journal of African Economies*. 10 (3) 227-257

<http://are.berkeley.edu/courses/EEP131/CostofProtection.pdf>

This study confirms that substantial barriers to market access will remain in both rich and poor countries following full implementation of the Uruguay Round agreement. The analysis finds that around 40 percent of the costs of these barriers to developing countries arise from barriers to market access in industrial countries, and 60 percent from barriers in developing countries themselves. The results suggest that there would be large gains to almost all regions from a round of negotiations that increased market access in North and South. In Africa, the potential static gains from multilateral reform appear to exceed those from preferential liberalization, without the well-known disadvantages of a preferential approach.

De Moor, A. and Calamai, P. 1997. Subsidising Unsustainable Development. The Hague: Institute for Research on Public Expenditure

http://www.ecouncil.ac.cr/econ/sud/subsidizing_unsd.pdf

The main aim of the analysis is to assess whether subsidy policies are actually serving their original purpose or have become counterproductive - and at what cost and with what effect on sustainable development. To this end, he describes the present state of play as regards the subsidising of four sectors, distinguishing in all cases the amounts in OECD states and the developing world. They look at the potential environmental, economic and social consequences of reforming existing policies, and derive a set of recommendations. The authors find that there is a direct causal connection between mispricing and unsustainable development, worth a figure between USD 700bn and USD 900bn on the value of total annual subsidies (not just the environmentally relevant ones) to the four sectors examined: water, agriculture, energy, and road traffic. This is equivalent to around 3-4 percent of the output of the world economy. Finally, they turn to the obstacles to reform. Next to the influence wielded by interest groups, inadequate support for change, in particular due to a dearth of information,

institutions and expertise, is identified. Recommendations include to make subsidies visible, publicise their costs and effects, list the winners and losers.

OECD. 1996. Subsidies and the Environment: Exploring the Linkages, Paris: OECD

OECD. 1998. Improving the Environment through Reducing Subsidies, Paris: OECD, 2 volumes

OECD. 1997. Reforming Energy and Transport Subsidies: Environmental and Economic Implications. Paris: OECD

Pearce, D. W. 2003. Environmentally harmful subsidies: barriers to sustainable development. In P. Prinsen-Geerligs, M. Patterson, A. Cox and M. Tingay (eds), Environmentally Harmful Subsidies: Policy Issues and Challenges. Paris: OECD, 9-30

<http://www.oecd.org/dataoecd/42/22/35215624.pdf>

There is now a substantial literature that addresses the key questions relating to environmentally harmful subsidies: *a priori* reasoning on why some, and probably most, subsidies damage the environment; how subsidies are to be defined; how large they are; and the sector-by-sector effects of subsidies on the environment. There remains, however, a need to define subsidies carefully to determine which are environmentally damaging, to detail the criteria by which their effects can be judged beneficial or detrimental to the goal of sustainable development, and to obtain a better appreciation of just how large subsidies are. Determining the *effects* of subsidies also matters. Even if it can be demonstrated that a given subsidy harms the environment relative to a baseline in which the subsidy does not exist, the subsidy may serve some other social purpose. The social and economic effects must also be gauged so that any trade-offs can be highlighted. However uncertain these estimates are, the general implications are clear. Subsidies probably total over USD 1 trillion per year. Around two thirds of the subsidies occur in OECD countries. Those OECD subsidies are heavily concentrated in agriculture, mining, road transport and manufacturing. Non-OECD countries mainly subsidise energy, water, fisheries and some agriculture. Relative to GDP, subsidies are twice as large in non-OECD countries. As a percentage of world GDP, global subsidies account for a staggering 4%. Perhaps most notable of all, agricultural subsidies in OECD countries account for over 30% of all subsidies. The environmental implications of the subsidies are potentially substantial.

Pearce, D. W and Finck von Finckenstein, D. 1999. Advancing Subsidy Reforms: Towards a Viable Policy Package. Paper prepared for UNEP: Fifth Expert Group Meeting on Financial Issues of Agenda 21, Nairobi, December 1999

http://www.uea.ac.uk/env/cserge/pub/wp/gec/gec_2000_12.pdf

World subsidies may total some \$800 billion, of which perhaps two-thirds occur in the developed economies of the OECD. Reforming subsidy regimes that damage the prospects for sustainable development is immensely complex. Simply calling for subsidy removal is unlikely to succeed. The complexity arises from the fact that subsidies are manifestations of rent-seeking, which, in turn is part of a wider category of unproductive activity in economic systems. The idea that subsidy reform is a 'win-win' policy is therefore misleading – there will always be losers, even if they are undeserving losers. In many cases, the most harmful subsidies will be those that are least easy to remove. Subsidy reform is therefore about dissipating rents, has to be part of a wider programme of macroeconomic and political reform. Subsidies are often linked to corruption, thus emphasising the difficulty of securing the political changes that are needed. Moreover, instituting democratic reform is not sufficient either: democratic societies have even larger subsidy regimes than less democratic societies. Political change has to be combined with economic reform. Some have advocated 'sudden shocks' whereby dramatic events are seized as an opportunity to institute reform. There is some evidence to suggest that if a crisis does occur, it may be best to implement subsidy reform along with other transitional measures in one large package. In the absence of crisis, a gradual approach is best. Policies need to be preannounced and gradual subsidy reduction needs to be combined with careful public awareness campaigns and efforts at political transparency and accountability. Bilateral and multilateral lenders have a strong role to play, even though reforming subsidies as part of a conditionality package is still controversial. Reform almost inevitably involves privatisation since exposure to market forces is essential for rent dissipation. Nonetheless, reform is complex and its success is difficult to guarantee. For example, privatisation may simply shift rents from the public to the private sector. Subsidy regimes seem peculiarly resilient to change.

Porter, G. 2003. Subsidies and the environment: an overview of the state of knowledge. In OECD. Environmentally Harmful Subsidies: Policy Issues and Challenges. Paris: OECD. 31-100

Schwartz, G and B. Clements. 1999. Government subsidies. Journal of Economic Surveys. 13(2): 119-147

van Beers, C. and van den Bergh, J. 2001. Perseverance of perverse subsidies and their impact on trade and environment. Ecological Economics. 36. 475-486

Can be purchased from <http://www.sciencedirect.com/science/article/B6VDY-42D29NN-9/2/fb0b00dc8913fdf4aa4945048b7d6b12>

Theoretical and empirical aspects of policy failures due to subsidies are discussed in the context of international trade. A general classification of subsidies that cause environmental externalities is presented. The economic and environmental impacts of producer subsidies on international trade are examined with partial equilibrium analysis. The magnitude and economic and environmental relevance of subsidies in various sectors is assessed on the basis of empirical indicators. Finally, suggestions are provided on how subsidy-related policy failures can be eliminated at national and international levels.

van Beers, C. and de Moor, S. 1998. Public Subsidies and Policy Failures: How Subsidies Distort the Natural Environment, Equity and Trade and How to Reform Them. Cheltenham: Edward Elgar



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Biodiversity Economics

www.biodiversityeconomics.org/index.html

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