ISBN 978-92-64-03431-0
People and Biodiversity Policies
Impacts, Issues and Strategies for Policy Action

Chapter 4

The Distributive Effects of Biodiversity Policies: Dynamic Analysis

4.1. Intergenerational equity: evaluating costs and benefits across time

Biodiversity policies have an explicit time dimension. The total economic value of biodiversity concept contains some important intertemporal components, such as option values, exploratory values or quasi-option values (Bulte and Withagen, 2006), and bequest values (Pearce and Moran, 1994). These values are conceptually tied to the future in the following ways:

- Option values arise from the continued preservation of habitats and ecosystems by allowing conversion decisions to be postponed into the future.
- Quasi-option values arise from new information becoming available in the future that allows new decisions about biodiversity management to be made.
- Bequest values arise from the ability to *pass on* habitats and ecosystems to future generations.

The time scales over which these value components become relevant range from the very short to the very long. Progress in the life sciences may very rapidly allow the identification of valuable genetic traits in plants or micro-organisms that cannot currently be identified. The time scale of the exploratory or quasi-option value may therefore be measured in months or a few years. On the other hand, in the context of climate change, society may want to postpone decisions to irrevocably convert habitats given that it is not clear at the moment to what extent habitats may be degraded as a result of changing precipitation patterns. Here the time scale would appropriately be measured in decades or rather hundreds of years.

Given this explicit time dimension, policy decisions today will affect individuals currently alive, as well as generations not yet born. The policy-making process therefore needs to compare benefits and costs of biodiversity policies that may arise at vastly different points in time and justify them against some measure of intergenerational equity. Methods to do this are commonly referred to as discounting techniques.

Discounting is a major concern for intergenerational equity in biodiversity policies: the longer the time horizon of the effects of a specific policy, the larger the impact of discounting. Hence, the evaluation of policies involving irreversible components, such as species extinction, loss of habitats and ecosystems depends

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to a large extent on the choice of the discounting model and its parameters. While this book can only broadly cover the issue of discounting, more detailed but accessible treatments (though not specifically on biodiversity policies) can be found in Pearce *et al.* (2003) and Groom *et al.* (2005).

4.2. Discounting

The economic tool for project evaluation is cost-benefit analysis (CBA). The basic rule is that if the social benefits exceed the social costs of a particular policy then it increases social welfare and should be implemented. This is a straightforward concept if both costs and benefits occur at the same instant or at least within a reasonably short time period, *e.g.* logging a single tree to obtain firewood in an otherwise intact forest. The costs of logging and the benefits of consumption occur in close succession.

However, if there is a considerable time interval between the two, for example if the costs have to be incurred right away while the benefits occur at some stage in the future (an investment), then how do we compare flows at such different points in time? Box 4.1 explains discounting. Extending the above example, if the tree is felled to build a house rather than to heat it, then the benefits occur over a longer period, *i.e.* the lifespan of the house. On the other hand, if the forest from which the tree is taken is close to collapse, the logging might have a significant impact on the survival of this ecosystem and the species therein. Hence, the costs are long-term too and might even contain irreversible elements, *e.g.* if some species are unique to this forest.

Box 4.1. **Discount factors**

Discounting is a method that systematically assigns different weights, called *discount factors,* to costs or benefits occurring at different points in time. These weights decrease over time, rendering distant costs and benefits less important. The conventional form of discounting, called "exponential discounting" uses a constant *discount rate* (*s*) to calculate discount factors w_t. The appropriate formula is then:

$$w_t = \frac{1}{(1+s)^t}$$

In principle, it is clear how individuals deal with the problem of assigning weights to future flows (*e.g.* payments) and there is a sizeable theoretical and empirical literature on how individuals discount future payoffs (Frederick *et al.*, 2002). However, it is very much debated how society as a whole should value costs and benefits occurring at different points in time and to different generations. Individuals usually prefer benefits now to benefits in the future, and benefits enjoyed by their children to benefits enjoyed by their great-grandchildren. This applies to money as well as to risks (Pearce *et al.*, 2003). Hence, if people's preferences count in policy evaluation, this impatience should show up in the cost-benefit rule.

In contrast to this, philosophers and prominent economists have argued in favour of a zero social discount rate (Broome, 1992; Ramsey, 1928; Solow, 1974) whereby the current generation should receive the same weight as all generations to come. One reason for discounting usually acknowledged by this school of thought is the fact that in each period there is a positive but very small probability that the human race will become extinct (Stern, 2006), perhaps by the impact of a meteorite or a highly infectious and deadly disease for which no antidote is found. Hence, there is a chance that future generations might not exist and hence any cost or benefit occurring to them can be discounted accordingly.

But even if present and future generations are treated equally, a further reason for discounting consumption (rather than utility) is that future generations are likely to be better off than current ones. Hence, given a decreasing marginal utility of consumption, an additional unit is worth less according to the future generation's own preferences than to the current ones. This effect competes with a contrasting one running in the opposite direction: there are some goods, such as many environmental amenities and biodiversity used for bioprospecting, whose availability does not increase at the same speed as consumption of manmade goods and for which no close substitutes are available. The marginal utility derived from such goods increases over time. This effect is reinforced if the supply of such goods declines due to conversion of natural landscapes, biodiversity loss and environmental degradation (Krutilla, 1967).

The probability that the human species will become extinct in any period is (by orders of magnitude) smaller than discount rates deduced from individuals' behaviour (see Frederick *et al.*, 2002). Moreover, in the latter there is a gap between developed and developing countries. While for the former, discount rates below 10% are common, for the latter, values above 25% and even above 100% have been estimated (GEF, 2006), reflecting the specific planning conditions in developing countries such as lower life expectancy, liquidity constraints and lower security of property rights. Hence, if policy choice is to be based on individual preferences, it might be crucial whether future costs and benefits occur to individuals living in developed or in developing countries. Moreover, applying discount rates based on empirical evidence in developed countries (*e.g.* 3.5% for the UK, see HM Treasury, 2003) can result in a serious lack of acceptance by local stakeholders in developing countries. If the benefits of the policy occur in the future, stakeholders might

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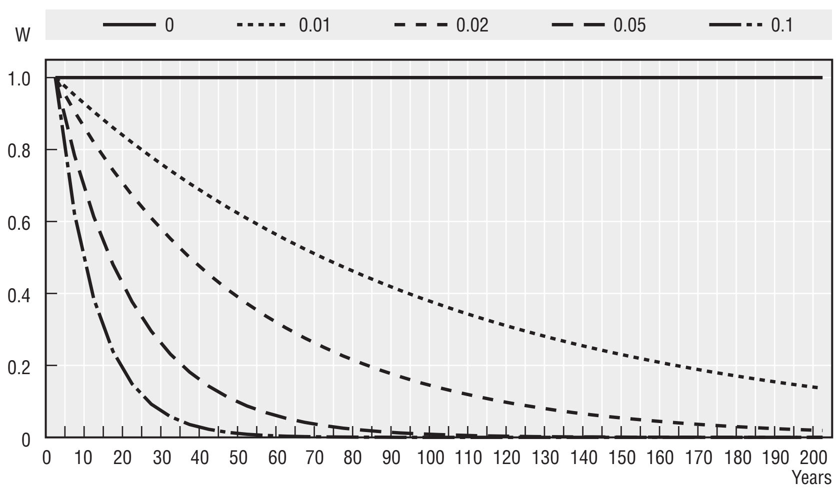
put a considerably lower value on them than the planner assumes. This is an important constraint for the design of voluntary and incentive-based biodiversity policies.

How the choice of the discount rate matters in the medium and long run is illustrated by Figure 4.1. It presents the evolution of discount factors corresponding to different discount rates. Discount rates of 0, 0.01 (1%), 0.02 (2%), 0.05 (5%) and 0.1 (10%) per year are shown over a 200 year period. The lines show what happens to an initial quantity ($w = 1$ in year 0) as a result of those discount factors. So, for people with a discount factor of 2%, a promise of EUR 100 in 40 years is today worth only EUR 45 ($w = 0.45$ in year 100). Alternatively, if a foreseen event was to cause a loss of EUR 100 in 40 years, then we would only be willing to pay EUR 45 to avoid that loss. In other words, a predictable loss of EUR 100 40 years from now might go unmitigated.

Figure 4.1. **The evolution of the discount factor over time for different constant discount rates**



What is the effect of discounting on decisions? By attaching lower values to costs and benefits occurring in the distant future, discounting (and hence, the choice of *s*) has a major impact on the outcome of cost-benefit analysis and project evaluation. This is especially so for distributive effects between generations where, by definition, long time horizons are involved and thus discounting is a key determinant for identifying a desirable policy. Higher discount rates imply lower importance attached to future generations. To illustrate this point, consider the examples in Table 4.1.

A biodiversity conservation project costs 1 million right now but yields 5 million in conservation benefits 50 years in the future. Whether the project passes the cost-benefit test depends on the discount rate chosen (see Table 4.1). For $s = 2\%$, the discount factor for $t = 50$ is 0.3715. Hence, the net benefit is $NB = 0.3715 \times 5 \text{ m} - 1 \text{ m} = 0.8575 \text{ m}$ and is thus greater than zero. The project is beneficial at a social discount rate of 2%. Repeating the same exercise with $s = 5\%$ yields a very different result. The corresponding discount factor is 0.0872 ($w_{50}[s{=}5\%]$). The net benefit is negative ($NB = 0.0872 \times 5 \text{ m} - 1 \text{ m} = -0.564 \text{ m}$). Hence, at a 5% social discount rate, the project would not go ahead.

Table 4.1. **Two hypothetical cost-benefit scenarios with exponential discounting**

Costs		Benefits		Discount rate *s*	Discount factor *w*	Net benefit	Evaluation
Amount	Year	Amount	Year				
1 million	0	5 million	50	*2%*	0.3715	0.8575 million	Desirable
1 million	0	5 million	50	*5%*	0.0872	–0.564 million	Not desirable

Discounting therefore affects the set of socially desirable policies, as well as putting constraints on their implementation. Careful consideration of discounting and its effects are therefore key for successful biodiversity policies.

4.2.1. The problem of discounting

Exponential discounting at a positive rate has been attacked as a "tyranny of the present". If very long-term policy decisions are considered, such as conversion of pristine land, flooding due to dam construction or biodiversity loss, any costs or benefits occurring to future generations receive little to almost no consideration in current decisions (see Figure 4.1). Hence, although distributive effects of some biodiversity policies might be huge, they would frequently be dwarfed by the application of discounting.

The immediate relevance of the discount rate to biodiversity policies is a mainstay of natural resource economics: Clark (1973) demonstrated that high intertemporal discount rates are a key reason why many managed species have been "rationally" driven to, or close to, extinction in the past, because the future benefits of their existence have been considered negligible when decisions were taken. Swanson (1994) extended Clark's (1973) framework to species and habitats that are not managed, and showed that the same logic can also explain habitat conversion and deleterious management practices that give rise to "extinction by neglect". Discounting and sustainable development are often regarded as irreconcilable.

The most popular proposal for solving the "tyranny of the present" is to abandon discounting altogether (*i.e.* using a zero discount rate). This

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essentially gives the same weight to all current and future generations, including those living a million years from now. Hence, any project that at some stage yields benefits that are greater than the costs (both undiscounted) is worthwhile. However, zero discounting, taken seriously, has important implications for broader macroeconomic decisions such as the savings rate. Savings should by far exceed their current level and consumption by the current generation should fall considerably in order to yield high benefits to a generation in a far distant future. In fact, current consumption might conceivably be at risk of being driven down to subsistence levels. On a more abstract level, zero discount rates also raise the possibility that it is no longer possible to even formulate an optimal consumption and savings path (Koopmans, 1965; Asheim *et al.*, 2001). Put somewhat more pointedly, using a zero discount rate might have prevented mankind from converting any pristine land and from using any non-renewable resources. Zero discounting has therefore been labelled "tyranny of the future".

4.2.2. Intergenerational equity: the role of uncertainty and risk

In terms of intergenerational equity, both a constant positive discount rate and a constant zero discount rate lead to unsatisfactory policy outcomes over the long time scales that characterise many biodiversity policies. So does a balanced solution exist?

One hopeful candidate is "hyperbolic discounting" (Box 4.2). While using strictly positive discount rates, it differs from exponential discounting in one important respect. The discount rate s is not constant but decreases over time. Hence, discount factors decrease less than they would for constant discount rates in the long-run.

One major argument in favour of declining discount rates is uncertainty about future states of the world. Two conceptualisations of this uncertainty have been proposed. While Weitzman (1998) assumes uncertainty over the future discount factor, Gollier (2002a, b) allows for uncertainty over consumption paths. Both approaches come to the same conclusion: discount rates are declining. Uncertainty over future states of the world is common in biodiversity policies. The bioprospecting value of species, the effect of losing ecosystem services and the preferences of future generations are all highly uncertain.

Declining discount rates are backed by a very different recent theoretical approach in the social choice tradition. If a social planner advocates a mixed goal which combines a high discount rate and a low (zero) discount rate, the result is a social discount rate that declines over time (Chichilinsky, 1996; Li and Löfgren, 2000). Moreover, hyperbolic discounting is supported by empirical evidence (see Frederick *et al.*, 2002); people seem to apply hyperbolic discounting in their everyday decision-making.

However, there is a drawback to the concept of declining discount rates. Most types suffer from what is called time-inconsistency. Using varying discount rates current optimal plans might not be consistent with what the same individual regards as optimal in the future (even in the absence of uncertainty about future states of the world and preferences). Hence, one does not stick to the original plan, *i.e.* policies are revised (if possible) as time passes and these deviations are (or at least could be) anticipated. If policy outcomes are irreversible, there might be regret. For example, although it seemed optimal to a social planner to convert some parcel of land, he/she later might regret this decision but be unable to restore its original state. While the occurrence of time-inconsistency under time-varying discount rates is widely accepted, there is a debate about whether this is actually a relevant problem (Pearce *et al.*, 2003).

Throughout, a key challenge in comparing costs and benefits of biodiversity policies across time by means of discounting is to answer the question of what constitutes the "right" discount rate. While this question arises with exponential as well as with hyperbolic discounting, with the latter it has an additional dimension. The problem is not only to pick a single parameter (which is difficult enough) but to choose an entire profile of discount rates. The use of hyperbolic discounting in the UK (Box 4.2) shows that important recent advances in addressing this problem can be reasonably implemented in real world policy. Transferring the approach to biodiversity policy would be straightforward.

4.3. Heterogeneous generations

Differences in discount rates used by individuals or groups within a generation are perhaps even more common and exaggerated than across generations. Box 4.2 shows the UK's discount rate starting at 3.5% in the early years, but then falling over time. The decline in the rate for UK policy is considerably smaller than the difference in discount rates across countries (Table 4.3). Rates vary by a factor of four, even within this relatively homogeneous sample. Less developed countries usually have higher discount factors as they rely on natural resources more than developed countries. Resource dependence is often associated with a higher discounting of future benefits since resources provide limited ability to distribute consumption over time. Poor countries that rely on consumptive aspects of biodiversity are more likely to manage their resources well, given that they rely on them for survival (though Diamond, 2005, provides some counter-examples). Nonetheless, subsistence is often used as a model of situations of high discount rates because the lack of sufficient reserves causes decisions to be made mainly on the basis of short-term considerations. Moreover, the non-consumptive

Box 4.2. **Hyperbolic discounting in the *UK Green Book***

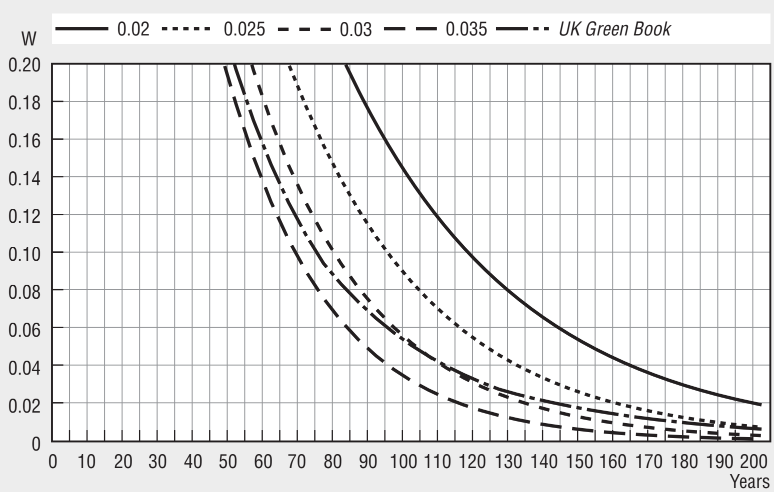
The evaluation of public policies in the UK is based on HM Treasury's (2003) *Green Book, Appraisal and Evaluation in Central Government*. For all projects with impacts lasting for less than 30 years a constant discount rate of 3.5% has to be used, based on empirical estimates for the UK. However, for policies with long-term effects the following pattern of discount rates is applied.

Table 4.2. **The declining long-term discount rate**

Period of years	Discount rate
0-30	3.5%
31-75	3.0%
76-125	2.5%
126-200	2.0%
201-300	1.5%
301+	1.0%

The effect of this stepwise decline in the discount rate is presented in Figure 4.2. While for the first 30 years the evolution of discount factors matches that of a constant 3.5% rate, for later periods the weight of future flows is significantly above that reference scenario, *e.g.* the weight put on any cost or benefit in year 200 is about six times as high with the declining discount rate than in the scenario with a constant rate of 3.5%; in year 300 the difference is already two orders of magnitude.

Figure 4.2. **Discount factors with decreasing discount rate of the *UK Green Book***



Source: HM Treasury (2003), Annex 6.

Table 4.3. **Discount rates as listed by Commissariat Général du Plan in France**

Country	Discount rate	Time horizon (years)
South Africa	8%	20-40
Germany	3%	Variable
Australia	6-7%	20-30
Canada	5-10%	20-50
Denmark	6-7%	30
United States	3-7%	Variable
Italy	5%	
France	8%	30
Hungary	6%	30
Japan	4%	40
Mexico	12%	30
Norway	5%	25
New Zealand	10%	25
Netherlands	4%	30
Portugal	3%	20-30
Czech Republic	7%	20-30
United Kingdom	3.5%	30
Sweden	4%	15-60
European Commission	5%	
World Bank	10-12%	

Source: Hepburn (2006).

benefits of biodiversity are likely to be highly discounted since they are associated with leisure time, a limited commodity at low income levels.

Underpinning the notion that developing countries have higher discount rates than developed countries is the observation that "liquidity constraints" force individuals to behave as if they cannot plan for the long term. That is, even when they know that postponing an action (*e.g.* consumption) to the future will bring greater overall benefit, they may be prevented from acting on that knowledge when they are unable to borrow against future benefits. The classic example is the farmer whose circumstances force him/her to eat the seed crop that was to be used to plant next season's crop. Such activity implies an extraordinarily high discounting of the future.

This heterogeneity across countries implies that when biodiversity is unevenly distributed globally, there will be differences in how much conservation one country is willing/able to undertake, and how much other countries would like it to undertake.

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4.3.1. Intergenerational equity and intragenerational equity

As most biodiversity policies have both long-term effects and affect people of different wealth we need to trade-off distributional effects against those across generations. For discussion on how to incorporate intragenerational equity into cost-benefit analysis see Section 2.3 of this book.

Helping the poor of today might harm future generations or *vice versa*. Hence, it is important to choose a consistent way to treat people living at different points in time and with different economic status. If the interests of the poor today are valued more than the interests of the rich, and if future generations tend to be better off than current ones, there is a case to be made for applying the same principle in both situations. The *Stern Review on the Economics of Climate Change* (Stern, 2006) has been criticised for being inconsistent on this important issue (*The Economist*, 2006).

The main concept that links the two issues is the elasticity of the marginal utility of consumption. This states by how many percent the utility of a person increases if his/her income increases by one percent. This is thought to be roughly constant across income classes. Hence, giving the same amount of money to a poor person (for whom it adds significantly to current consumption) creates more utility than if it is given to a better off person (for whom it is just a further drop in an already large pool). For consistency of the two dimensions of equity the same income elasticity has to be used when calculating the effective discount rate and distributional weights used to adjust for different income levels among members of the same generation. The *UK Green Book* (HM Treasury, 2003) assumes an elasticity of one in both cases.

4.4. Summary and conclusions

Part I has introduced the key concepts relevant to the analysis of distributive impacts of biodiversity policies – efficiency, cost effectiveness and distributive impacts – and how they relate to policies for maintaining and improving biologically diverse habitats and ecosystems. It has explained the role of CBA for biodiversity policy-making and how the integration of efficiency rules based on CBA has strengthened the case for biodiversity policies to be considered as important alongside other policy issues. At the same time, it has stressed that by using the concept of net social gains, CBA is severing the ties with richer welfare-theoretic dimensions.

We have explained how distributive impacts can be empirically measured, quantified in terms of summary values, and communicated in a policy-making context. We have also presented a positive analysis of the distributive effects of biodiversity policies, drawing from a rich set of case studies and examples to explain the links between policy objectives, instrument choice and welfare outcomes, while bearing in mind the success of the policy in maintaining and improving species-rich habitats and ecosystems. Important distributive dimensions that are dealt with are the spatial and the intertemporal distribution of welfare impacts associated with biodiversity-related policies. Our main conclusions are as follows:

- There are many suitable approaches for measuring distributive impacts, with differing data requirements and ability to capture these impacts. However, not all measures are equally useful in different conservation contexts. Hence, there is a need to develop criteria for judging the information contained in different measures and their adequacy for specific contexts.
- The distributive impacts of biodiversity policies are real and in many cases non-marginal. The primary distributive effects of biodiversity policies are likely to be pro-rich for both theoretical and empirical reasons. The secondary distributive effects are determined by the choice of instruments, which can mitigate or amplify the primary distributive effects. A wide variety of instruments is available for mitigating and potentially reversing distributive effects.
- The trend towards market-based instruments in biodiversity policies is likely to ameliorate the negative impacts on the poor of traditional instruments, such as protected area policies. However, there is evidence that while market-based instruments do not hurt lower income households, higher income households tend to profit relatively more.
- A “spatial mismatch of costs and benefits” (Wells, 1992) has been identified for some biodiversity policies, with local people often bearing most of the costs and populations of far-away countries receiving most of the benefits. However, if handled well, protection for conservation can be pro-poor because protected areas spell out – often for the first time – the precise nature of use rights in an area. Local communities may gain from protected areas because outside competitors are excluded.
- At the international level, current distributional problems are likely to persist. Many of the difficulties in translating the international willingness to pay for biodiversity conservation into flows of funds to areas of high conservation importance remain unresolved. The prevailing internationally agreed sharing rules for gains from international co-operation on biodiversity conservation contribute to this outcome.
- There is a significant intergenerational distributive dimension of biodiversity policies, since biodiversity policy decisions today will affect individuals currently alive, as well as generations not yet born. Ensuring that decisions taken today do not affect future generations can be addressed by varying the discount of costs and benefits arising at different

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points in time (hyperbolic discounting). At the same time, consistency between inter- and intragenerational equity is required.

With these key concepts, measurement methods, and empirical observations in mind, we now turn to the question of whether policy-makers should consider and address distributive issues *within* biodiversity policies – or whether these distributive issues should be left out of the picture when deciding between different courses of action.

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References

Adger, W.N and C. Luttrell (2000), "Property Rights and the Utilisation of Wetlands", *Ecological Economics,* 35 (2000) 75-89.

Adger, W.N. *et al.* (1997), "Property Rights and the Social Incidence of Mangrove Conversion in Vietnam", *CSERGE Working Paper* GEC 97-21.

Adhikari, B. (2002), "Household Characteristics and Common Property Forest Use: Complementarities and Contradictions", *Journal of Forestry and Livelihoods,* 2: 3-14.

Adhikari, B. (2005), "Poverty, Property Rights and Collective Action: Understanding the Distributive Aspects of Common Property Resource Management", *Environment and Development Economics* 10: 7-31.

Adhikari, B., S. di Falco and J.C. Lovett (2004), "Household Characteristics and Forest Dependency: Evidence from Common Property Forest Management in Nepal", *Ecological Economics*, 48:245 257.

Aggarwal, R.M. and T.A. Narayan (2004), "Does Inequality Lead to Greater Efficiency in the Use of Local Commons? The Role of Strategic Investments in Capacity", *Journal of Environmental Economics and Management* 47, 163-182.

Alavalapati, J.R.R., W.L. Adamowicz and W.A. White (1999), "Distributive Impacts of Forest Resource Policies in Alberta", *Forest Science* 45(3), 342-348.

Albers H.J. and E. Grinspoon (1997), "A Comparison of the Enforcement of Access Restrictions Between Xishuangbanna Nature Reserve (China) and Khao Yai National Park (Thailand)", *Environ. Conserv.* 24:351-62.

Aldred, J. and M. Jacobs (2000), "Citizens and Wetlands: Evaluating the Ely Citizens' Jury", *Ecological Economics*, 34:217 232.

Alexander, J. and J.-A. McGregor (2000), "Wildlife and Politics: CAMPFIRE in Zimbabwe", *Development and Change* 31(3), 605-627.

Alix-Garcia, J., A. de Janvry and E. Sadoulet (2004), "A Tale of Two Communities: Explaining Deforestation in Mexico", *World Development* 33(2), 219-235.

Allali-Puz H., E. Béchaux and C. Jenkins (2003), "Governance et democratic locale dans les Parcs Naturels Régionaux de France", *Policy Matters* 12:225-237.

Allegretti, M. (1990), "Extractive Reserves: An Alternative for Reconciling Development and Environmental Conservation in Amazonia", in Anderson, A. (ed.) (1990) *Alternatives to Deforestation: Steps Toward Sustainable Use of the Amazon Rain Forest*, Columbia University Press, New York.

Allegretti, M. (2002), *A construção social de políticas ambientais: Chico Mendes e o Movimento dos Seringueiro,* Centro de Desenvolvimento Sustentável, Universidade de Brasília PhD Thesis, Brasília, Brazil.

Allgood, S. and A. Snow (1998), "The Marginal Cost of Raising Tax Revenue and Redistributing Income", *Journal of Political Economy* 106(6), 1246-1273.

Alston, L. *et al.* (1999), "A model of rural conflict: violence and land reform policy in Brazil", *Environment and Development Economics* 4, 135-160.

Amend, S. and T. Amend (1995), *National Parks Without People? The South American Experience,* IUCN, Gland, Switzerland.

Amiel, Y., J. Creedy and S. Hurn (1999), "Measuring Inequality Aversion", *Scandinavian Journal of Economics* 101 (1), 83-96.

Andersen, I.-E. and B. Jaeger (1999), "Danish Participatory Models: Scenario Workshops and Consensus Conferences: Towards More Democratic Decision-making", *Science and Public Policy*, 5: 331-340.

Angelsen, A., and S. Wunder (2003), *Exploring the Forest-Poverty Link: Key Concepts, Issues and Research Implications,* Center for International Forestry Research, Bogor, Indonesia.

Arnot, C., P. Boxall and S.B. Cash (2006), "Do Ethical Consumers Care About Price? A Revealed Preference Analysis of Fair Trade Coffee Purchases", *Canadian Journal of Agricultural Economics/Revue canadienne d'agroéconomie* 54 (4), 555-565.

Arrow, K.J. (1950), "A Difficulty in the Concept of Social Welfare", *Journal of Political Economy* 58(4) (August, 1950), 328-346.

Asheim, G.B., W. Buchholz and B. Tungodden (2001), "Justifying Sustainability", *Journal of Environmental Economics and Management* 41(3), 252-268.

Atkinson, A. and F. Bourguignon (1982), "The Comparison of Multi-Dimensioned Distributions of Economic Status", *Review of Economic Studies* 49 (1982), 183-201.

Atkinson, A.B. (1970), "On the Measurement of Inequality", *Journal of Economic Theory* 2, 244-263.

Baland, J.-M. and J.-P. Platteau (1997), "Wealth Inequality and Efficiency in the Commons Part I: The Unregulated Case", *Oxford Economic Papers* 49, 451-482.

Baland, J.-M. and J.-P. Platteau (1998), "Wealth Inequality and Efficiency in the Commons Part II: The Regulated Case", *Oxford Economic Papers* 50, 1-22.

Balmford, A. *et al.* (2000), "Integrating Conservation Costs into International Priority Setting", *Conservation Biology* 11, 597-605.

Balmford, A. *et al.* (2001), "Conservation Conflicts Across Africa", *Science* 291 (30 March), 2616-2619.

Balmford, A., *et al.* (2003), "Global Variation in Terrestrial Conservation Costs, Conservation Benefits, and Unmet Conservation Needs", *Proceedings of the National Academy of Sciences of the United States of America* 100, 1046-1050.

Balmford, A. and T. Whitten (2003), "Who Should Pay for Tropical Conservation, and How Could the Costs be Met?" *Oryx* 37, 238-250.

Bannon, I. and P. Collier (2003), "Natural Resources and Conflict: What We Can Do", in *Natural Resources and Violent Conflict: Options and Actions*, World Bank, Washington, DC.

Barbier, E.B. and M. Cox (2004), "An Economic Analysis of Shrimp Farm Expansion and Mangrove Conservation in Thailand", *Land Economics* 80(3), 389-407.

Barbier, E.B., and M. Rauscher (1995), "Policies to Control Tropical Deforestation: Trade Intervention *versus* Transfers", in C. Perring *et al.* (ed.), *Biodiversity Loss: Economic and Ecological Issues*, Cambridge University Press, Cambridge.

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Bardhan. P. (1996), "Efficiency, Equity and Poverty Alleviation: Policy Issues in Less Developed Countries", *Economic Journal* 106, 1344-1356.

Barrett, C.B., D.R. Lee and J.G. McPeak, (2005), "Institutional Arrangements for Rural Poverty Reduction and Resource Conservation", *World Development,* Vol. 33(2), 193-197.

Baumol, W.J. and W.E. Oates (1988), *The Theory of Environmental Policy*, Cambridge University Press, Cambridge.

Bedunah D.J. and S.M. Schmidt (2004), "Pastoralism and Protected Area Management in Mongolia's Gobi Gurvansaikhan National Park", *Dev. Change* 35(1): 167-91.

Bellon, M.R. and J.E. Taylor (1993), "Folk Soil Taxonomy and the Partial Adoption of New Seed Varieties", *Economic Development and Cultural Change*, 41(4), 763-786.

Bergstrom, T.C. and R.P. Goodman (1973), "Private Demands for Public Goods", *American Economic Review,* 63(3), 280-296.

Bergstrom, T., L. Blume and H. Varian (1986), "On the Private Provision of Public Goods", *Journal of Public Economics* 29, 25-49.

Berkes, F. (1999), *Sacred Ecology: Traditional Ecological Knowledge and Resource Management*, Taylor and Francis, Philadelphia, USA.

Beukering, P.H. van, H. Cesara and M.A. Janssen (2003), "Economic Valuation of the Leuser National Park on Sumatra, Indonesia", *Ecological Economics* 44(1), February 2003, 43-62.

Bingham, G. (1986), *Resolving Environmental Disputes, A Decade of Experience,* The Conservation Foundation, Washington DC.

Bojo, J. and R.C. Reddy (2002), *Poverty Reduction Strategies and Environment: A Review of 40 Interim and Full Poverty Reduction Strategy Papers*, World Bank, Washington D.C.

Borcherding, T.E. and R.T. Deacon (1972), "Demand for Services of Non-Federal Governments", *American Economic Review*, 62(5), 891-901.

Borrini-Feyerabend, G. *et al.* (2004), *Sharing Power: Learning by Doing in Co-management of Natural Resources Throughout the World*, IIED and IUCN/CEESP/CMWG, Cenesta, Tehran.

Bovenberg, A.L. and B.J. Heijdra (1998), "Environmental Tax Policy and Intergenerational Distribution", *Journal of Public Economics* 67, 1-24.

Boyce, J.K. (2002), *The Political Economy of the Environment*, Edward Elgar, Cheltenham, UK

Brainard, J.S. *et al.* (2006), "Exposure to Environmental Urban Noise Pollution in Birmingham, UK", in: Serret and Johnstone (eds.), *The Distributional Effects of Environmental Policy*, Edward Elgar, Cheltenham, UK.

Brett, C. and M. Keen (2000), "Political Uncertainty and the Earmarking of Environmental Taxes", *Journal of Public Economics* 75, 315-340.

Brooks, N and R. Sethi (1997), "The Distribution of Pollution: Community Characteristics and Exposure to Air Toxics", *Journal of Environmental Economics and Management*, 32, 233-250.

Broome, J. (1992), *Counting the Cost of Global Warming*, White Horse Press, Cambridge.

Brown, K. (1998), "The Political Ecology of Biodiversity, Conservation and Development in Nepal's Terai: Confused Meanings, Means and Ends", *Ecological Economics* 24(1), 73-87.

Brown, K. and S. Rosendo (2000), "Environmentalists, Rubber Tappers and Empowerment: The Politics and Economics of Extractive Reserves", *Development and Change*, 31: 201-227.

Brown, K. *et al.* (2001), "Trade-off Analysis for Marine Protected Area Management", *Ecological Economics*, 37: 417-434.

Bruner A. *et al.* (2001), "Effectiveness of Parks in Protecting Tropical Biodiversity", *Science* 291(5501): 125-28.

Buchanan, J.M. (1963), "The Economics of Earmarked Taxes", *Journal of Political Economy* 71(5), 457-469.

Buchy, M., H. Ross and W. Proctor (2000), *Enhancing the Information Base on Participatory Approaches in Australian Natural Resources Management*, Commissioned Report to the Land and Water Resources Research and Development Corporation, Canberra.

Bueno de Mesquita, B. *et al.* (2003), *The Logic of Political Survival,* MIT Press, Cambridge, Mass.

Bulte, E. and C. Withagen (2006), *Distributive Issues in a Dynamic Context: an Issues Paper*, OECD, Paris.

Bulte, E.H., R. Damania and R.T. Deacon (2005), "Resource Intensity, Institutions, and Development", *WorldDevelopment* 33(7), 1029-1044.

Burnham, P. (2000), *Indian Country God's Country: Native Americans and National Parks*, Island Press, Washington, DC.

Burton, P.S. (2004), "Hugging Trees: Claiming *de facto* Property Rights by Blockading Resource Use", *Environmental and Resource Economics* 27, 135-163.

Campbell, B. *et al.* (2001), "Challenges to Proponents of Common Property Resource Systems: Despairing Voices from the Social Forests of Zimbabwe", *World Development* 29: 589-600.

Canadian Model Forest Network (2006), *Canadian Model Forest Network: Achievements*, Natural Resources Canada, Ottawa.

Carruthers J. (1995), *The Kruger National Park: A Social and Political History,* Univ. Natal Press, Pietermaritzburg, South Africa.

Carson, L. and K. Gelber (2001), *Ideas for Community Consultation: A Discussion on Principles and Procedures for Making Consultation Work*, NSW Department of Urban Affairs and Planning, Sydney, Australia.

Catton T. (1997), *Inhabited Wilderness: Indians, Eskimos, and National Parks in Alaska,* Univ. N. Mex. Press, Albuquerque.

Cavendish, W. (2000), "Empirical Regularities in the Poverty-Environment Relationship of Rural Households: Evidence from Zimbabwe", *World Development*, 28, (11), 1979-2003.

CBD (Convention on Biological Diversity) (1992), *Convention on Biological Diversity*, *http://sedac.ciesin.org/entri/texts/biodiversity.1992.html*.

CBD (2005), *Thematic Report on Mountain Ecosystems, Nepal*, *www.biodiv.org/doc/world/np/np-nr-me-en.doc*.

 PEOPLE AND BIODIVERSITY POLICIES – ISBN 978-92-64-03431-0 – © OECD 2008

Cernea, M.M. and K. Schmidt-Soltau (2006), "Poverty Risks and National Parks: Policy Issues in Conservation and Resettlement", *World Development* 34(10), 1808-1830.

Chakraborty, R.N. (2001), "Stability and Outcomes of Common Property Institutions in Forestry: Evidence from the Terai Region of Nepal", *Ecological Economics* 36, 341-353.

Chapin, M. (2004), "A Challenge to Conservationists", *World Watch Magazine*, November/December 2004, 17-31.

Chatty, D. and M. Colchester (eds.) (2002), *Conservation and Mobile Indigenous Peoples: Displacement, Forced Settlement and Sustainable Development,* Berghahn Books, New York.

Chichilinsky, G. (1996), "An Axiomatic Approach to Sustainable Development", *Social Choice and Welfare* 13, 231-257.

Chichilnisky, G. and G. Heal (1994), "Who Should Abate Carbon Emissions? An International Viewpoint", *Economics Letters* 44, 443-449.

Chobotova, V. and T. Kluvankova-Oravska (2006), *Community-based Management of Biodiversity Conservation in a Transition Economy. Application of Multi-Criteria Decision Aid to the Nature Reserve Šúr,* case study prepared for OECD, OECD, Paris.

Clark, C.W. (1973), "Profit Maximization and the Extinction of Animal Species", *Journal of Political Economy* 81(4), 950-961.

Clean Water Action Plan (2000), *Watershed Success Stories: Applying the Principles and Spirit of the Clean Water Action Plan*, USA

Cleary, D. (2006), "The Questionable Effectiveness of Science Spending by International Conservation Organizations in the Tropics", *Conservation Biology* 20(3), 733-738.

Clippel, G. de (2005), *Equity, Envy, and Efficiency under Asymmetric Information*, Working Paper, Rice University, Houston.

Cobham, A. (2007), *Tax Evasion, Tax Avoidance and Development Finance*, University of Oxford, Department of International Development, Oxford.

Coomes, O., B. Barham, and Y. Takasaki (2004), "Targeting Conservation-Development Iniatives in Tropical Forests: Insights from Analysis of RainForest Use and Economic Reliance among Amazonian peasants", *World Development* 55, 47-64.

Cooperative Conservation America (2005), *Faces and Places of Cooperative Conservation*, report of White House Conference on Cooperative Conservation, St. Louis, Missouri, August 29-31, 2005, US Department of the Interior, Washington DC.

Cork, S. (2002), "What are Ecosystem Services?", *RIPRAP* (River and Riparian Lands Management Newsletter), Land and Water Australia, Canberra, 21, pp.1-9.

Costanza, R. *et al.* (1997), "The Value of the World's Ecosystem Services and Natural Capital", *Nature* 387, 253-261.

Cowell, F.A. and K. Gardiner (1999), "Welfare Weights", *STICERD, London School of Economics, Economics Research Paper* 20, Aug 1999, LSE, London.

Crosby, N. (1996), *Creating an Authentic Voice of the People: Deliberation on Democratic Theory and Practice.* Midwest Political Science Association, Chicago, USA.

CSIRO (Commonwealth Scientific and Industrial Research Organisation) (2003), *Natural Values: Exploring Options for Enhancing Ecosystem Services in the Goulburn Broken Catchment*, Ecosystem Services Project, CSIRO, Canberra, Australia.

Dasgupta, P. (2000), "Valuing Biodiversity", in Levin, S. (ed.) *Encyclopedia of Biodiversity*, Academic Press, New York.

Datta, S.K. and S. Kapoor (1996), *Collective Action, Leadership and Success in Agricultural Cooperatives – a Study of Gujarat and West Bengal*, Oxford and IBH Publishing, Oxford and New Dehli.

Day-Rubinstein, K. and G.B. Frisvold (2001), "Genetic Prospecting and Biodiversity Development Agreements", *Land Use Policy* 18(3), 205-219.

Deacon, R.T. (2006), "Distributive Issues Related to Biodiversity: The Role of Institutions", presentation prepared for the *OECD Workshop on Distributive Issues Related to Biodiversity*, Oaxaca, Mexico, April 26-27, 2006.

Declerck, S. (2003), "Restoration of Lake Kraenepoel in Belgium, a Case Study Prepared for the BIOFORUM Project", in: Young, J. *et al.* (eds.), *Conflicts Between Human Activities and the Conservation of Biodiversity in Agricultural Landscapes, Grasslands, Forests, Wetlands and Uplands in Europe*, Report of the BIOFORUM projects, August, 2003, 116-119, BIOFORUM, Centre for Ecology and Hydrology, Edinburgh.

Demsetz, H. (1967), "Toward a Theory of Property Rights", *American Economic Review* 57(2), Papers and Proceedings, 347-359.

Department of Sustainability and Environment (DSE) (2005a), *Southern Victoria BushTender: Information Sheet No. 5*, Victorian Government Department of Sustainability and Environment, Melbourne.

DSE (2005b), *Southern Victoria BushTender: Information Sheet No. 6*, Victorian Government Department of Sustainability and Environment, Melbourne.

DSE (2005c), *Southern Victoria BushTender: Information Sheet No. 7*, Victorian Government Department of Sustainability and Environment, Melbourne.

Diamond, J. (2005), *Collapse: How Societies Choose to Fail or Succeed*, Viking, New York.

Dietz, T., E. Ostrom and P.C. Stern (2003), "The Struggle to Govern the Commons", *Science* 302, 1907-1912.

Dixit, A.K. and J.E. Stiglitz (1977), "Monopolistic Competition and Optimum Product Diversity", *American Economic Review*, 67(3), 297-308.

Dixon, J.A. and P.B. Sherman (1990), *Economics of Protected Areas: A New Look at Benefits and Costs*, East-West-Center Center, Island Press, Washington DC.

Dixon, J.A. and P.B. Sherman (1991), "Economics of Protected Areas", *Ambio,* 20(2), 68-74.

Drazen, A. (2001), *Political Economy in Macroeconomics*, Princeton University Press, Princeton.

Drechsler, M. *et al.* (2007), "An Agglomeration Payment for Cost-Effective Biodiversity Conservation in Spatially Structured Landscapes", *UFZ Discussion Papers* 4/2007, March 2007, UFZ Centre for Environmental Research Leipzig, Germany.

Dressler, W.H. (2006), "Co-opting Conservation: Migrant Resource Control and Access to National Park Management in the Philippine Uplands", *Development and Chance* 37(2), 401-426.

Drèze, J.P. (1998), "Distribution Matters in Cost-Benefit Analysis: Comment on K-A. Brekke", *Journal of Public Economics* 70 (3): 485-88.

Drèze, J.P. and N. Stern (1987), "The Theory of Cost-Benefit Analysis", in A.J. Auerbach and M. Feldstein (eds.) *Handbook of Public Economics* 2, North-Holland, Amsterdam.

Droege, S. and B. Soete (2001), "Trade-Related Intellectual Property Rights, North-South Trade and Biological Diversity", *Environmental and Resource Economics* 19, 149-163.

Dublin, H., C. Volonte and J. Brann (2004), *GEF Biodiversity Program Study,* Washington, D.C.: Monitoring and Evaluation Unit, Global Environment Facility Secretariat.

Easterbrook, G. (2003), *The Progress Paradox,* Random House, New York.

Emerton, L., J. Bishop and L. Thomas (2005), *Sustainable Financing of Protected Areas: A Global Review of Challenges and Options*, IUCN, Gland, Switzerland and Cambridge, UK.

Engel, S., R. Lopez and C. Palmer (2006), "Community–Industry Contracting over Natural Resource use in a Context of Weak Property Rights: The Case of Indonesia", *Environmental and Resource Economics* 33(1), 73-93.

Environment Canada (2005), *The Canadian Ecological Gifts Program Handbook 2005: A Legacy for Tomorrow, a Tax Break Today*, available at: *www.cws-scf.ec.gc.ca/ecogifts/hb_toc_e.cfm.*

Environmental Defense (2000), *Progress on the Back Forty: An Analysis of the Three Incentive Based Approaches to Endangered Species Conservation on Private Lands*, Environmental Defense, New York.

EPA (US Environmental Protection Agency) (2001), *Protecting and Restoring America's Watersheds: Status, Trends, and Initiatives in Watershed Management*, EPA-840-R-00-001, US EPA, Washington DC.

Eskeland, G. and C. Kong (1998), "Protecting the Environment and the Poor: A Public Goods Framework Applied to Indonesia", *World Bank Policy Research Working Paper* No. 1961, World Bank, Washington, DC.

European Commission (2005), *Agri-environment Measures: Overview on General Principles, Types of Measures, and Application,* study of the European Commission Directorate General for Agriculture and Rural Development, Unit G-4, Evaluation of Measures applied to Agriculture, available at: *http://ec.europa.eu/agriculture/publi/reports/agrienv/rep_en.pdf.*

Fearnside, P.M. (2003), "Conservation Policy in Brazilian Amazonia: Understanding the Dilemmas", *World Development* 31(5): 757-779.

Feinerman, E., A. Fleischer and A. Simhon (2004), "Distributional Welfare Impacts of Public Spending: The Case of Urban *versus* National Parks", *Journal of Agricultural and Resource Economics* 29(2): 370-386.

Ferraro, P.J. (2002), "The Local Costs of Establishing Protected Areas in Low-Income Nations: Ranomafana National Park, Madagascar", *Ecological Economics*, 43: 261-275.

Ferraro, P.J. and D. Simpson (2002), "The Cost-Effectiveness of Conservation Payments", *Land Economics* 78(3), 339-353.

Fisher, M. (2004), "Household Welfare and Forest Dependence in Southern Malawi", *Environment and Development Economics* 9: 135-154.

Fisher, M., G.E. Shively and S. Buccola (2005), "Activity Choice, Labor Allocation, and Forest Use in Malawi", *Land Economics* 81 (4), 503-517.

Fisher, R., W. Ury and B. Patton (1991), *Getting to Yes: Negotiating Agreement Without Giving In*, Penguin Books, New York.

Fishkin, J. and R.C. Luskin (2004), "Experimenting with a Democratic Ideal: Deliberative Polling and Public Opinions", paper prepared for presentation at the *Swiss Chair's Conference on Deliberation*, The European University Institute, Florence, Italy, May 21-22, 2004.

Flores, N. and R. Carson (1997), "The Relationship Between the Income Elasticities of Demand and Willingness to Pay", *Journal of Environmental Economics and Management* 33, 287-295.

Fraga, J. (2006), "Local Perspectives In Conservation Politics: The Case of the Ria Lagartos Biosphere Reserve, Yucatan, Mexico", Landscape and Urban Planning, 74(3-4), 285-295

Frank, G. and F. Müller (2003), "Voluntary Approaches in Protection of Forests in Austria", *Environmental Science and Policy*, 6: 261-269.

Frederick, S., G. Loewenstein and T. O'Donoghue (2002), "Time Discounting and Time Preferences: A Critical Review", *Journal of Economic Literature* 40, 351-401.

Freudenburg, W., L. Wilson and D. O'Leary (1998), "Forty Years of Spotted Owls? A Longitudinal Analysis of Logging Industry Job Losses", *Sociological Perspectives* 41(1), 1-26.

Gale, D. (1973), "Pure Exchange Equilibrium In Dynamic Economic Models", *Journal of Economic Theory* 6, 12-36.

Gaston, K. (2005), "Biodiversity and Extinction: Species and People", *Progress in Physical Geography* 29(2), 239-247.

Gatti, R. *et al.* (2004), "The Biodiversity Bargaining Problem", *Cambridge Working Papers in Economics*, No. 0447, Faculty of Economics, University of Cambridge, Cambridge, UK.

Gawler, M. (ed.) (2002), "Strategies for Wise Use of Wetlands: Best Practices in Participatory Management", in proceedings of a workshop held at the *2nd International Conference on Wetlands and Developments* (November 1998, Dakar, Senegal), Wetlands International, IUCN, WWF publication No. 56, Wageningen, Netherlands.

GEF (Global Environment Facility), 2006, "The Role of Local Benefits in Global Environmental Programs", *Evaluation Report No.* 30, Global Environment Facility Evaluation Office, Washington DC.

Geisler, C. and de Sousa, R. (2001), "From Refuge to Refugee: The African Case", *Public Adm. Dev.* 21: 159-70.

Gerlagh, R. and M.A. Keyzer (2001), "Sustainability and the Intergenerational Distribution of Natural Resource Entitlements", *J. Public Econom.* 79 (2001) 315-341.

Gibson, C.C., J.T. Williams and E. Ostrom (2005), "Local Enforcement and Better Forests", *World Development* 33(2), 273-284.

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

Gjertsen, H. and C.B. Barrett (2004), "Context-Dependent Biodiversity Conservation Management Regimes: Theory and Simulation", *Land Economics* 80(3): 321-339.

Goeschl, T. and D. Igliori (2004), "Reconciling Conservation and Development: A Dynamic Hotelling Model of Extractive Reserves", *Land Economics* 80(3), 340-354.

Goeschl, T. and D. Igliori (2006), "Property Rights for Biodiversity Conservation and Development: Extractive Reserves in the Brazilian Amazon", *Development and Change* 37(2), 427-51.

Gollier, C. (2002a), "Time Horizon and the Discount Rate", *Journal of Economic Theory* 107(2), 463-473.

Gollier, C. (2002b), "Discounting an Uncertain Future", *Journal of Public Economics* 85, 149-166.

Googch, G.D., G. Jansson and R. Mikaelsson (2003), *Results of Focus Groups Conducted in the River Basin Area of Motala Ström, Sweden*, River Dialogue Project, Department of Management and Economics, Political Science, Linköping University.

Grady, S. (2000), "Kakadu National Park, Australia, Case study 11", in Beltran, J. (ed.), *Indigenous and Traditional Peoples and Protected Areas: Principles, Guidelines and Case Studies*, IUCN, Gland, Switzerland.

Grimble, R. *et al.* (1995), "Trees and Trade-Offs: A Stakeholder Approach to Natural Resource Management", *Gatekeeper Series* No. 52., International Institute for Environment and Development, London.

Groier, M. (2004), "Socioeconomic effects of the Austrian Agro-Environmental Program. Mid-Term Evaluation 2003", *Facts and Feature* 27. Bundesanstalt für Bergbauernfragen, Vienna.

Groom, B., *et al.* (2005), "Declining Discount Rates: The Long and the Short of it", *Environmental and Resource Economics* 32(4), 445-493.

Hamilton, J.T. (2006), "Environmental Equity and the Sitting of Hazardous Waste Facilities in OECD Countries", in Serret and Johnstone (eds.), *The Distributional Effects of Environmental Policy*, Edward Elgar, Cheltenham, UK.

Hanley, N. and C. Spash (1993), *Cost Benefit Analysis and the Environment,* Edward Elgar, Cheltenham.

Hardin, G. (1968), "The Tragedy of the Commons", *Science* 168(3859), Dec. 13th 1968, 1243-48.

Harford, T. (2003), "Fair Trade Coffee Has a Commercial Blend", *Financial Times*, 12 Sept. 2003, 15.

Haro, G.O., G.J. Doyo and J.G. McPeak (2005), "Linkages Between Community, Environmental, and Conflict Management: Experiences from Northern Kenya", *World Development* 33(2), 285-299.

Heady, C. (2000), "Natural Resource Sustainability and Poverty Reduction", *Environment and Development Economics*, 5: 241-258.

Heal, G. (1999), "Markets and Sustainability", *The Science of The Total Environment* 240(1-3), October 1999, 75-89.

Hegan, R.L., G. Hauer and M.K. Luckert (2003), "Is the Tragedy of the Commons Likely? Factors Preventing the Dissipation of Fuelwood Rents in Zimbabwe", *Land Economics* 79 (2): 181-197.

Hepburn, C. (2006), "*Use of Discount Rates in the Estimation of the Costs of Inaction with Respect to Selected Environmental Concerns*", Working Party on National Environmental Policies, OECD, Paris.

Herrera, A. and da Passano, M.G. (2006), "Land Tenure Alternative Conflict Management", *FAO Land Tenure Manuals* No. 2, Food and Agriculture Organisation of the United Nations, Land Tenure Service, Rural Development Division, Rome.

Hiedanpää, J. (2002), "European-Wide Conservation Versus Local Well-Being: The Reception of the Natura 2000 Reserve Network in Karvia, SW-Finland", *Landscape and Urban Planning* 61: 113-123.

HM Treasury (2003), *The Green Book – Appraisal and Evaluation in Central Government – Treasury Guidance*, TSO, London.

Hökby, S. and T. Söderqvist (2003), "Elasticities of Demand and Willingness to Pay for Environmental Services in Sweden", *Environmental and Resource Economics*, 26, 361-383.

Homma, A.K.O. (1992), "The Dynamics of Extraction in Amazonia: A Historical Perspective", in Nepstad, D.C. and S. Schwartzman (eds.), *Non-Timber Products from Tropical Forests: Evaluation of a Conservation and Development Strategy*, Advances in Economic Botany 9: 33-42, The New York Botanical Garden, New York.

Horne, P. (2004), "Forest Owners' Acceptance of Incentive Based Instruments in Forest Biodiversity Conservation – A Choice Experiment Based Approach", paper presented at the *48th Annual Conference of the Australian Agriculture and Resource Economics Society*.

Horne, P. and A. Naskali (2006), *Voluntary Scheme for Forest Protection on Private Land as Part of the METSO Programme in Finland*, Finnish Forest Research Institute, case study prepared for OECD, Paris.

Horowitz, J.K. and K.E. McConnell (2003), "Willingness to Accept, Willingness to Pay and the Income Effect", *Journal of Economic Behavior and Organization*, 51(4), 537-545.

Horton, B., *et al.* (2003), "Evaluating Non-Users' Willingness to Pay for the Implementation of a Proposed National Parks Program in Amazonia", *Environmental Conservation* 20(2), 139-146.

Howarth, R. (2000), "*Normative Criteria for Climate Change Policy Analysis*", Redefining Progress, San Francisco.

Hubacek, K and W. Bauer (1999), *Economic Incentive Measures in the Creation of the National Park Neusiedler See Seewinkel*, OECD, Paris.

Humphreys, D. (2001), "Forest Negotiations at the United Nations: Explaining Cooperation and Discord", *Forest Policy and Economics*, 3: 125-135.

Islam, M and J.B. Braden (2006), "Bio-economic Development of Floodplains: Farming Versus Fishing in Bangladesh", *Environment and Development Economics* 11, 95-126.

James, R.F. (1999), "Public Participation and Environmental Decision-Making – New Approaches", paper presented at the *National Conference of the Environmental Institute of Australia*, 1-3 December, 1999.

James, R.F. and R.K. Blamey (2000), *A Citizens' Jury Study of National Park Management, Canberra*, Australian National University, Canberra, available at: *http://cjp.anu.edu.au*.

Jepson, P., F. Momberg and H. van Noord (2002), "A Review of the Efficacy of the Protected Area System of East Kalimantan Province, Indonesia", *Nat. Areas J.* 22(1): 28-42.

Johannesen, A.B. and A. Skonhoft (2004), "Property Rights and Natural Resource Conservation. A Bio-Economic Model with Numerical Illustrations from the Serengeti-Mara Ecosystem", *Environmental and Resource Economics* 28(4), 469-488.

Johansson-Stenman, O. (2005), "Distributive Weights in Cost-Benefit Analysis – Should We Forget About Them?", *Land Economics* 81(3), 337-352.

Jones, B. and M. Murphree (2001), "The Evolution of Policy on Community Conservation in Namibia and Zimbabwe", in D. Hulme and M. Murphree (eds.) *African Wildlife and Livelihoods: The Promise and Performance of Community Conservation*, James Currey, Oxford.

Just, R.E., D.L. Hueth and A. Schmitz (2004), *The Welfare Economics of Public Policy*, Edward Elgar, Cheltenham, UK.

Just, R.E. and D.L. Hueth (1979), "Multimarket Welfare Measurement", *American Economic Review* 69(5), 947-54.

Justino, P., J. Litchfield and Y. Niimi (2004), "Multidimensional Inequality: An Empirical Application to Brazil", *PRUS Working Paper No.* 24, Poverty Research Unit, Department of Economics, University of Sussex.

Kahn, M. and J. Matsusaka (1997), "Demand for Environmental Goods. Evidence from Voting Patterns on California Initiatives", *Journal of Law and Economics* 40, 137-173.

Kakwani, N.C. (1977), "Measurement of Tax Progressivity: An International Comparison", *Economic Journal* 87(345), 71-80.

Kalter, R.J. and T.H. Stevens (1971), "Resource Investment, Impact Distribution, and Evaluation Concepts", *American Journal Agricultural Economics*, 53(2), 206-215.

Kelly, B., M. Brown and O. Byers (eds.) (2001), *Mexican Wolf Reintroduction Program,Three-Year Review Workshop: Final Report*, IUCN/SSC Conservation Breeding Specialist Group, Apple Valley, MN, USA.

Kenyon, W. and C. Nevin (2001), "The Use of Economic and Participatory Approaches to Assess Forest Development: A Case Study in the Ettrick Valley", *Forest Policy and Economics* 3: 69-80.

Khare, A. and D. Bray (2004), *Study of Critical New Forest Conservation Issues in the Global South,* Ford Foundation, New York.

Kishor, N. and R. Damania (2006), "Crime and Justice in the Garden of Eden: Improving Governance and Reducing Corruption in the Forestry Sector", in J. Edgardo Campos and S. Pradhan (eds.), *The Many Faces of Corruption: Tracking Vulnerabilities at the Sector Level,* The World Bank, Washington, DC.

Kolm, S. (1977), "Multidimensional Egalitarianisms", *Quarterly Journal of Economics* 91 (1977), 1.

Konisky, D.M. and T.C. Beierle (2001), "Innovation in Public Participation and Environmental Decision Making: Examples from the Great Lakes Region", *Research Note, Society and Natural Resources* 14: 815-826.

Kontogianni A. *et al.* (2001), "Integrating Stakeholder Analysis in Non-Market Valuation of Environmental Assets", *Ecological Economics* 37: 123-138.

Koopmans, T. (1965), "On the Concept of Optimal Economic Growth", in: Pontificiae Academiae Scientiarium Scriptum Varia (ed.)*: The Economic Approach to Development Planning,* North-Holland, Amsterdam.

Kothari A. (2004), "Displacement Fears", *Frontline,* 21(26), 18-31 Dec., India. Available at *www.frontlineonnet.com/fl2126/stories/20041231000108500.htm*.

Kooten, G.C. van and E.H. Bulte (2000), *The Economics of Nature: Managing Biological Assets*, Wiley-Blackwell Publishing.

Kramer, R. and E. Mercer (1997), "Valuing a Global Environmental Good: US Residents' Willingness to Pay to Protect Tropical Rain Forests", *Land Economics* 73, 196-210.

Krautkraemer, J.A. and R.G. Batina (1999), "On Sustainability and Intergenerational Transfers with a Renewable Resource", *Land Economics* 75, 167-184.

Kriström, B. (2006), "Framework for Assessing the Distribution of Financial Effects of Environmental Policy", in Y. Serret and N. Johnstone (eds.), *The Distributional Effects of Environmental Policy*, Edward Elgar, Cheltenham, UK.

Kriström, B and P. Riera (1996), "Is the Income Elasticity of Environmental Improvements Less Than One?"*Environmental and Resource Economics*, 7, 45-55.

Krüger O. (2004), "The Role of Ecotourism in Conservation: Panacea or Pandora's Box?"*Biodivers. Conserv.* 14(3): 579-600.

Krutilla, J.V. (1967), "Conservation Reconsidered", *American Economic Review* 57(4), 777-786.

Kumar, S. (2002), "Does Participation' in Common Pool Resource Management Help the Poor? A Social Cost-Benefit Analysis of Joint Forest Management in Jharkhand, India", *World Development* 30: 763-782.

Lake, D. and M. Baum (2001), "The Invisible Hand of Democracy: Political Control and the Provision of Public Services", *Comparative Political Studies* 34(6), 587-621.

Langholz, J.A. and W. Krug (2004), "New Forms of Biodiversity Governance: Non State Actors and the Private Protected Area Action Plan", *Journal of International Wildlife Law and Policy*, 7, 9-29.

Lawrence, D. (2000), *Kakadu: The Making of a National Park,* Melbourne Univ. Press, Melbourne, Australia.

Leakey, R.E., and R. Lewin (1995), *Sixth Extinction: Patterns of Life and the Future of Humankind,* Anchor Books, New York.

Lee, D.R. and C.B. Barrett (2001), *Tradeoffs or Synergies? Agricultural Intensification, Economic Development and the Environment*, CABI Publishing, Wallingford, UK.

Libecap, G.D. and J. Smith (2002), "The Economic Evolution of Petroleum Property Rights in the United States", *Journal of Legal Studies* 31(2), 589-608.

Li, C.Z. and K.G. Löfgren (2000), "Renewable Resources and Economic Sustainability: A Dynamic Analysis with Heterogeneous Time Preferences", *Journal of Environmental Economics and Management* 40, 236-250.

Lind, R.C. (1995), "Intergenerational Equity, Discounting, and the Role of Cost-Benefit Analysis in Evaluating Global Climate Policy", *Energy Policy* 23: 379-389.

Linde-Rahr, M. (1998), *Rural Reforestation: Gender Effects on Private Investments in Vietnam*, Working Paper, Department of Economics, Goteborg University, Sweden.

Lopez, T.T. de (2003), "Economics and Stakeholders of Ream National Park, Cambodia", *Ecological Economics* 46: 269-282.

Luck, G. *et al.* (2004), "Alleviating Spatial Conflict Between People and Biodiversity", *Proceedings of the National Academy of Sciences* 101(1), 182-186.

Lusty, C. (2000), "The Lapponian Area, Sweden", Case study 5, in Beltran, J. (ed.), *Indigenous and Traditional Peoples and Protected Areas: Principles, Guidelines and Case Studies*, IUCN, Gland, Switzerland.

Lybbert, T.J., C.B. Barrett and H. Narjisse (2002), "Market-based Conservation and Local Benefits: The Case of Argan Oil in Morocco", *Ecological Economics* 41, 125-144.

Lynch, L. and S. Lovell (2003), "Combining Spatial and Survey Data to Explain Participation in Agricultural Land Preservation Programs", *Land Economics* 79 (2): 259-276.

Maasoumi, E. (1986), "The Measurement and Decomposition of Multi-Dimensional Inequality", *Econometrica* 54 (1986), 991-997.

Mahatny S. and D. Russel (2002), "High Staked: Lessons from Stakeholder Groups in the Biodiversity Conservation Network", *Society and Natural Resources*, 15: 179-188.

Maikhuri, R.K. *et al.* (2000), Analysis and Resolution of Protected Area-People Conflicts in Nanda Devi Biosphere Reserve, India, *Environmental Conservation* 27(1): 43-53.

Marcouiller, D.W. and J.C. Stier (1996), *Modelling the Regional Economic Aspects of Forest Management Alternatives*, research paper, McIntere Stennis Program of USDA, University of Wisconsin, Medison, USA.

Margulis, S. (2004), "Causes of Deforestation of the Brazilian Amazon", *World Bank Working Paper* No. 22, The World Bank, Washington DC.

Markandya, A. (2001), "Poverty Alleviation and Sustainable Development: Implications for the Management of Natural Capital", prepared for the International Institute for Sustainable Development (IISD) *Workshop on Poverty and Sustainable Development*, 23rd January, Ottawa.

Marsiliani, L. and T.I. Renström (2000), "Time Inconsistency in Environmental Policy: Tax Earmarking as a Commitment Solution", *Economic Journal* 110, 123-138.

Mashinya, J. (2007), *Participation and Devolution in Zimbabwe's CAMPFIRE Program: Findings from Local Projects in Mahenyeand Nyamiyami*, Faculty of Graduate School of the University of Maryland, USA.

McLean, J. and S. Straede (2003), "Conservation, Relocation and the Paradigms of Park and People Management – A Case Study of Padampur Villages and the Royal Chitwan National Park, Nepal", *Soc. Nat. Res.* 16: 509-26.

McNeely, J.A. and S.J. Scherr (2003), *Ecoagriculture: Strategies to Feed the World and Save Wild Biodiversity*, Island Press, Washington, DC.

Menezes, M. (1994), "As Reservas Extrativistas como Alternativa ao Desmatamento na Amazônia", in Arnt, R. (ed.) *O Destino da Floresta: Reservas Extrativistas e Desenvolvimento Sustentável na Amazônia*, Relume Dumará, Rio de Janeiro.

Meyer, S. (2001), "Community Politics and Endangered Species Protection", in: Shogren, J. and J. Tschirhart (eds.), *Protecting Endangered Species in the United States. Biological Needs, Political Realities, Economic Choices* Cambridge University Press, Cambridge.

Millimet, D. and D. Slottje (2000), *The Distribution of Pollution in the United States: An Environmental Gini Approach*, working paper, Southern Methodist University, Dallas, Texas.

Mirrlees, J. (1979), *The Implications of Moral Hazard for Optimal Insurance*, mimeo, seminar given at the conference held in honor of Karl Borch, Bergen, Norway.

Moore, C. (1996), *The Mediation Process – Practical Strategies for Resolving Conflict*, 2nd edition, Wiley/Jossey-Bass publishers, San Francisco.

Moore, L, L. Michaelson and S. Orenstein (2000), *Designation of Critical Habitat National Project, Digest of the Process and Results*, Institute of Environmental Conflict Resolution, Tuscon, Arizona.

Morris, C. (2004), "Networks of Agrienvironmental Policy Implementation: A Case Study of England's Countryside Stewardship Scheme", *Land Use Policy*, 21: 177-191.

Mourmouras, A. (1993), "Conservationist Government Policies and Intergenerational Equity in an Overlapping Generations Model with Renewable Resources", *Journal of Public Economics* 51, 249-268.

Mowat, S. (2006), *The Design and Implementation of the Entry Level Scheme in England, DEFRA, UK*, case prepared for the OECD.

Musgrave, R.A. (1959), *The Theory of Public Finance*, McGraw Hill, New York.

Musinguzi, M. (2006), "Making Partnerships for Sustainable Gorilla Tourism in Mgahinga Mountain", *Mountain Forum Bulletin*, Volume VI, Issue 1, January 2006, pp. 4-5 *www.mtnforum.org.*

Naidoo, R. and W.L. Adamowicz (2005), "Biodiversity and Nature-Based Tourism at Forest Reserves in Uganda", *Environment and Development Economics* 10: 159-178.

Naidoo, R. and W.L. Adamowicz (2006a), "Mapping the Economic Costs and Benefits of Conservation", *Public Library of Science-Biology* 4(11), 2153-2163.

Naidoo, R. and W.L. Adamowicz (2006b), "Modeling Opportunity Costs of Conservation in Transitional Landscapes", *Conservation Biology* 20, 490-500.

Nath, S.K. (1969), *A Reappraisal of Welfare Economics,* Routledge, London.

National Round Table on the Environment and the Economy (2005), *Boreal Futures: Governance, Conservation and Development in Canada's Boreal,* National Round Table on the Environment and the Economy, Ottawa.

Natural Resources Canada (2005), *First Nations Forestry Program – Success Stories,* Natural Resources Canada, Canadian Forestry Service, Ottawa (online: *www.fnfp.gc.ca/index_e.php*)

Neary, J.P. (1999), "Comment on Venables (1999) Economic Policy and the Manufacturing Base: Hysteresis in Location", In: Baldwin, R. E., Francois, J. F. (eds.), *Dynamic Issues in Commercial Policy Analysis*, Cambridge University Press, Cambridge, 196-200.

Nepal S..J. (2000), "Wood Buffalo National Park, Canada", Case study 4, in Beltran, J. (ed.), *Indigenous and Traditional Peoples and Protected Areas: Principles, Guidelines and Case Studies*, IUCN, Gland, Switzerland.

Neumann, R. (2004), "Moral and Discursive Geographies in the War for Biodiversity in Africa", *Polit. Geogr.* 23: 813-37.

Nijkamp, P., P. Rietveld and H. Voogd (1990), *Multi-criteria Evaluation in Physical Planning*, North Holland, Amsterdam.

North, D.C. (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge.

O'Connor, M. (2000), "The VALSE project – an introduction", *Ecological Economics* 34: 165-174.

O'Leary, R. and L. Bingham (2004), *The Promise and Performance of Environmental Conflict Resolution*, Resources for the Future, Washington DC.

OECD (Organisation for Economic Co-operation and Development) (1996), *Saving Biological Diversity: Economic Incentives*, OECD, Paris

OECD (1997), *Evaluating Economic Instruments for Environmental Policy,* OECD, Paris.

OECD (1999), *Handbook of Incentive Measures for Biodiversity: Design and Implementation* OECD, Paris.

OECD (2002), *Handbook of Biodiversity Valuation: A Guide for Policy Makers*, OECD, Paris.

OECD (2003), *Harnessing Markets for Biodiversity Towards Conservation and Sustainable Use*, OECD, Paris.

OECD (2004), *OECD Environmental Performance Reviews: Sweden*, OECD, Paris.

OECD (2006), *OECD Environmental Performance Reviews: Korea*, OECD, Paris.

Ohl, C. *et al.* (2006), "Managing Land Use and Land Cover Change in the Biodiversity Context with Regard to Efficiency, Equality and Ecological Effectiveness", *UFZ-Discussion Papers* 3/2006, February 2006, UFZ Centre for Environmental Research Leipzig, Germany.

Okun, A.M. (1975), *Equality and Efficiency: The Big Tradeoff*, The Brookings Institution, Washington DC.

Ostrom, E. and R. Gardner (1993), "Coping with Asymmetries in the Commons: Self-Governing Irrigation Systems Can Work", *Journal of Economic Perspectives*, 7(4), 93-112.

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.

Pearce, D. (1983), *Cost-Benefit Analysis,* Second edition, MacMillan, London.

Pearce, D. (1998), "Cost-benefit Analysis and Environmental Policy", *Oxford Review of Economic Policy*, 144, 84-100.

Pearce, D. (2006), "Framework for Assessing the Distribution of Environmental Quality", in Serret, Y. and N. Johnstone (eds.), *The Distributional Effects of Environmental Policy*, Edward Elgar, Cheltenham, UK.

Pearce, D. and D. Moran (1994), *The Economic Value of Biodiversity,* IUCN and Earthscan, London.

Pearce, D. and R.K. Turner (1990), *Economics of Natural Resources and the Environment,* Johns Hopkins Press, Baltimore.

Pearce, D. and D. Ulph (1995), "A Social Discount Rate For The United Kingdom", *CSERGE Working Paper* No. 95-01, School of Environmental Studies University of East Anglia, Norwich, UK.

Pearce, D., G. Atkinson and S. Mourato (2006), *Cost Benefit Analysis and the Environment: Recent Developments*, OECD, Paris.

Pearce, D. *et al.* (2003), "Valuing the Future – Recent Advances in Social Discounting", *World Economics* 4(2), 121-141.

Pelletier, M. (2002), *Enhancing Cree Participation by Improving The Forest Management Planning Process,* a project of the Waswanipi Cree Model Forest, Natural Resources Canada, Canadian Forest Service, Ottawa.

Peluso, NL. (1993), "Coercing Conservation: The Politics of State Resource Control", *Glob. Environ. Change* 3(2): 199-218.

Perrings, C. *et al.* (eds.) (1995), *Biodiversity Loss: Economic and Ecological Issues,* Cambridge University Press, Cambridge.

Pezzey, J. (1992), *Sustainable Development Concepts: An Economic Analysis*, World Bank, Washington, DC.

Pretty, J. (2003), "Social Capital and the Collective Management of Resources", *Science* 302 (12 Dec. 2003), 1912-1914.

Proctor, W. (2000), "Towards Sustainable Forest Management, An Application of Multi-criteria Analysis to Australian Forest Policy", paper presented at the *Third International Conference of the European Society for Ecological Economics,* 3-6 May 2000, Vienna, Austria.

Proctor, W. and M. Drechsler (2003), "Deliberative Multicriteria Evaluation: A case study of recreation and tourism options in Victoria Australia", paper presented at the *European Society for Ecological Economics, Frontiers 2 Conference*, Tenerife, 11-15 February 2003.

Quang, D.V. and T.N. Anh (2007), "Commercial Collection of NTFPs and Households Living in or Near the Forests: Case study in Que, Con Cuong and Ma, Tuong Duong, Nghe An, Viet Nam", *Ecological Economics*, forthcoming.

Radner, R. and J. Stiglitz (1984), "A Nonconcavity in the Value of Information," in M. Boyer and R. Kihlstrom (eds.) *Bayesian Models in Economic Theory*, Elsevier Science Publishers, New York.

Ramsey, F.P. (1928), "A Mathematical Theory of Saving", *Economic Journal* 38, 543-559.

Rangarajan, M. (1996), *Fencing the Forest: Conservation and Ecological Change in India's Central Provinces 1860-1914,* Oxford University Press, New Delhi.

Rao, M., A. Rabinowitz and S.T. Khaing (2002), "Status Review of the Protected-Area System in Myanmar, with Recommendations for Conservation Planning", *Conserv. Biol.* 16(2): 360-68.

Reardon, T. and S.A. Vosti (1995), "Links Between Rural Poverty and the Environment in Developing Countries: Asset Categories and Investment Poverty", *World Development* 23(9), 1495-1506.

Reddy, S.R.C. and S. P. Chakravarty (1999), "Forest Dependence and Income Distribution in a Subsistence Economy: Evidence from India" *World Development* 27(7), 1141-1149.

Reid, H. *et al.* (2004), "Co-management of Contractual National Parks in South Africa: Lessons from Australia", *Conservation and Society*, 2, 2: 377-409.

Reiling, S.D., H. Cheng and C. Trott (1992), "Measuring the Discriminatory Impact Associated with Higher Recreational Fees", *Leisure Science* 14(1992): 121-137.

River Dialogue (2003), *River Dialogue Newsletter* 1, September 2003, *www.riverdialogue.org.*

River Dialogue (2004), *River Dialogue Newsletter* 2, April 2004, *www.riverdialogue.org.*

Roberts, E.H. and M.K. Gautam (2003), *Community Forestry Lessons from Australia: A Review of International Case Studies*, research report presented to Faculties Research Grant Scheme 2002-2003, The Australian National University, School Resources, Environment and Society, Canberra, Australia.

Russell, C. and W. Vaughan (1982), "The National Recreational Fishing Benefits of Water Pollution Control", *Journal of Environmental Economics and Management, 198*2, 328-354.

Saberwal, V., M. Rangarajan and A. Kothari (eds.) (2000), *People, Parks and Wildlife: Towards Co-Existence,* Orient Longman Limited, Hyderabad, India.

Sachs, J.D. and A.M. Warner (1997), "Fundamental Sources of Long-Run Growth", *American Economic Review*, 87(2), 184-88.

Schläpfer, F. and N. Hanley (2003), "Do Local Landscape Patterns Affect the Demand for Landscape Amenities Protection?" *Journal of Agricultural Economics* 54(1), 21-35.

Schläpfer, F., A. Roschewitz and N. Hanley (2004), "Validation of Stated Preferences for Public Goods: A Comparison of Contingent Valuation Survey Response and Voting Behaviour", *Ecological Economics,* 51(1/2), 1-16.

Schmidt-Soltau, K. (2003), "Conservation-related Resettlement in Central Africa: Environmental and Social Risks", *Dev. Change* 34: 525-51.

Schneider, F. (2005), "Shadow Economies of 145 Countries All over the World: What Do We Really Know?" *Crema Research Working Paper* 2005-13. Center for Research in Economics, Management and the Arts, Basel.

Schou, J.S. and J.C. Streibig (1999), "Pesticide Taxes in Scandinavia", *Pesticide Outlook* 10, Dec. 1999, 127-129.

Sen, A.K. (1997), *Choice, Welfare and Measurement*, Harvard University Press, Cambridge, MA.

Serret, Y. and N. Johnstone, (2006), *The Distributional Effects of Environmental Policy*, Edward Elgar, Cheltenham, UK.

Shyamsundar, P. and R. Kramer (1997), "Biodiversity Conservation – At What Cost? A Study of Households in the Vicinity of Madagascar's Mantadia National Park", *Ambio*, 26(3), 180-184.

Simpson, R.D., R.A. Sedjo and J.W. Reid (1996), "Valuing Biodiversity for Use in Pharmaceutical Research", *Journal of Political Economy* 104(1), 163-185.

Smith, R.J. *et al.* (2003), "Governance and the Loss of Biodiversity", *Nature* 426(6962), 67-70.

Smith, S. (1995), "*'Green' Taxes and Charges: Policy and Practice in Britain and Germany*", The Institute of Fiscal Studies, London.

Smyth, D. (2001), "Joint Management of National Parks in Australia", in Baker, R., Davies, J. and Young, E. (eds.), *Working on Country, Contemporary Indigenous Management of Australia's Lands and Coastal Regions*, Oxford University Press, Oxford, United Kingdom.

Solow, R.M. (1974), "The Economics of Resources or the Resources of Economics", *American Economic Review* 64(2), 869-877.

Southgate, D. (1998), *Tropical Forest Conservation: An Economic Assessment of the Alternatives in Latin America*, Oxford University Press, Oxford.

Southgate, D. *et al.* (2000), "Markets, Institutions and Forestry: The Consequences of Timber Trade Liberalization in Ecuador", *World Development* 28(11), 2005-2012.

Spence M. (1999), *Dispossessing the Wilderness: Indian Removal and the Making of the National Parks,* Oxford Univ. Press, New York.

Start, D. and I. Hovland (2004), *Tools for Policy Impact, A Handbook for Researchers,* Research and Policy Development Programme, Overseas Development Institute, London.

Stern, N. (1997), *Macroeconomic Policy and the Role of the State in a Changing World; Development Strategy and Management of the Market Economy*. Volume 1, Oxford University Press, Clarendon Press for the United Nations, Oxford and New York.

Stern, N. (2006), *Stern Review on the Economics of Climate Change*, HMS Treasury, London

Stoll-Kleemann, S. (2001), "Reconciling Opposition to Protected Areas Management in Europe: The German Experience", *Environment* 43(5), 32-44.

Suman, D., M. Shivlani and J.W. Milon (1999), "Perceptions and Attitudes Regarding Marine Reserves: A Comparison of Stakeholder Groups in the Florida Keys National Marine Sanctuary", *Ocean and Coastal Management*, 42: 1019-1040.

Sunderlin, W.D. *et al.* (2005), "Livelihoods, Forests, and Conservation in Developing Countries: An Overview", *World Development* 33, 9, 1383-1402.

Swanson, T. (1994), "The Economics of Extinction Revisited and Revised: A Generalized Framework for the Analysis of the Problem of Endangered Species and Biodiversity Losses", *Oxford Economic Papers* 46, 800-821.

Swanson, T. (ed.) (1995), *The Economics and Ecology of Biodiversity Decline,* Cambridge University Press, Cambridge.

Swanson, T. (1996), "The Reliance of Northern Economies on Southern Biodiversity: Biodiversity as Information", *Ecological Economics* 17(1), 1-8.

Taylor, D.F. (2001), "Employment-based Analysis: An Alternative Methodology for Project Evaluation in Developing Regions, with an Application to Agriculture in Yucatán", *Ecological Economics*, 36: 249-262.

Taylor, D.F. and I. Adelman (1996), *Village Economies: The Design, Estimation and Use of Village-wide Economic Models*, Cambridge University Press, Cambridge.

The Economist (2006), "Shots Across the Stern", *The Economist,* Economics Focus, 13 Dec. 2006.

The Economist (2007), "Conservation in Colorado", *The Economist,* 1 Feb. 2007.

Theil, H. and R. Finke (1983), "The Consumer's Demand for Diversity", *European Economic Review*, 23(3), 395-400.

Tikka, P.M. (2003), "Conservation Contracts in Habitat Protection in Southern Finland", *Environmental Science and Policy*, 6, 271-278.

Torell, D.J. (1993), "Viewpoint: Alternative Dispute Resolution in Public Management", *Journal of Range Management* 46 (6), November, 70-73.

Trannoy, A. (2003), "About the Right Weight of the Social Welfare Function when Needs Differ", *IDEP Working Papers* 2004 0304, Institut d'economie publique (IDEP), Marseille, France.

US Department of Interior, US Fish and Wildlife Service and Environmental Defense (2005a), *Conservation Profiles: Landowners Help Imperiled Wildlife*, US Fish and Wildlife Service, Washington DC.

US Department of Interior, US Fish and Wildlife Service, National Association of Conservation Districts, USDA, American Forest Foundation and Environmental Defence (2005b), *Working Together: Tolls for Helping Imperiled Wildlife on Private Lands*, US Fish and Wildlife Service, Washington DC.

UNDP (United Nations Development Programme) (1990), *Human Development Report 1990*, United Nations Development Programme, United Nations, New York.

Unsworth, R. *et al.* (2005), *Mexican Wolf Blue Range Reintroduction Project 5-Year Review, Socio-economic Component,* US Fish and Wildlife Service, Arlington, Virginia.

Warr, P.G. (1983), "The Private Provision of a Public Good is Independent of the Distribution of Income", *Economics Letters* 13, 207-211.

Wätzold, F. and M. Drechsler (2005), "Spatially Uniform *versus* Spatially Heterogeneous Compensation Payments for Biodiversity-Enhancing Land-Use Measures", *Environmental and Resource Economics* 31, 73-93.

Weimer, D.L. and A.R. Vining (1998), *Policy Analysis – Concepts and Practice*, third edition, Prentice Hall.

Weitzman, M.L. (1998), "Why the Far Distant Future Should be Discounted at its Lowest Possible Rate", *Journal of Environmental Economics and Management* 36, 201-208.

Wells, M. (1992), "Biodiversity Conservation, Affluence and Poverty: Mismatched Costs and Benefits and Efforts to Remedy Them", *Ambio* 21(3), 237-243.

Wells, M., K. Brandon and L. Hannah (1992), *People and Parks: Linking Protected Area Management with Local Communities,* The World Bank, Washington DC.

Wick, K. and E.H. Bulte (2006), "Contesting Resources – Rent Seeking Conflict and the Natural Resource Curse", *Public Choice* 128: 457-476.

Wickham, T. (1997) "Community-based Participation in Wetland Conservation: Activities and Challenges of the Danau Sentarium Wildlife Reserve Conservation Project, Danau Sentarium Wildlife Reserve, West Kalimantan, Indonesia", case study 5, in Claridge, G. and O'Callaghan (eds.), *Community Involvement in Wetland Management: Lessons from the Field*, Proceedings of Workshop 3. Wetlands, Local People and Development, International Conference on Wetlands Development, 9-13 October 1995, Kuala Lumpur, Malaysia, Wetlands International, Kuala Lumpur.

Willig, R.D. (1976), "Consumer's Surplus without Apology", *American Economic Review* 66(4), 589-97.

Wilson, R.K. (2003), "Community-Based Management and National Forests in the Western United States- Five Challenges", *Policy Matters* 12: 216-224.

World Bank (2002), *Operational Policy 4.12: Involuntary Resettlement*, The World Bank, Washington, DC.

World Bank (2006), *Strengthening Forest Law Enforcement and Governance: Strengthening a Systemic Constraint to Sustainable Development*, report No. 36638-GLB, The World Bank, Washington, DC.

Young, Z, Makoni, G and Boehmer Christiansen, S. (2001), "Green Aid in India and Zimbabwe – Conserving Whose Community?" *Geoforum* 32, 299-318.

Zbinden, S. and D.R. Lee (2005) "Paying for Environmental Services: An Analysis of Participation in Costa Rica's PSA Program", *World Development* 33(2), 255-272.

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PEOPLE AND BIODIVERSITY POLICIES – ISBN 978-92-64-03431-0 – © OECD 2008

From:

People and Biodiversity Policies

Impacts, Issues and Strategies for Policy Action

Access the complete publication at:

https://doi.org/10.1787/9789264034341-en

Please cite this chapter as:

Bagnoli, Philip, Timo Goeschl and Eszter Kovacs (2008), “The Distributive Effects of Biodiversity Policies: Dynamic Analysis”, in *People and Biodiversity Policies: Impacts, Issues and Strategies for Policy Action*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/9789264034341-5-en