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Governing the global commons: Linking carbon sequestration and biodiversity conservation in tropical forests ☆

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ABSTRACT

Biodiversity loss will be among the major impacts from climate change. Separate international political processes address climate change and biodiversity, yet the scientific evidence strongly links the two. For conservation groups, addressing climate change is increasingly necessary to protect biodiversity. Protecting tropical forests as biodiversity habitat is important as well to mitigating climate change, as deforestation and forest degradation represent a major source of greenhouse gas emissions. Thus, discussions currently underway on the political and technical feasibility of rewarding countries and their inhabitants financially for protecting their standing forests as carbon sinks are of vital interest to conservation groups.

1. Introduction

The Millennium Ecosystem Assessment (2005) and other recent scientific assessments (e.g. IPCC, 2007; Lovejoy and Hannah, 2005; Parmesan and Yohe, 2003) find that future climate change is likely to have significant repercussions for biodiversity through changes in habitat and species range, adding to existing threats like unsustainable harvesting, deforestation, disruption of migration paths by infrastructure and human settlements, and introduction of invasive species. Thus, conservation-minded organizations have had to confront climate change as a serious threat to their goals and objectives.

This article considers how conservation organizations have had to evolve in order to be able to respond effectively to the climate change problem. This represents the latest phase of an evolution that had previously seen many conservation organizations shift emphasis from domestic conservation efforts in rich countries, where they have achieved considerable success, to protecting biodiversity hotspots, many in tropical rainforests of developing countries.

Conservation, or environmental, non-governmental organizations (ENGOs for short) have also been reassessing the role of different types of institutions and exploring various incentive and financing mechanisms for biodiversity conservation. This has been a response in part to a broad shift in environmental policy thinking towards market-conforming regulation, and in part to the recognition of weak government capacity in many developing countries to enforce regulations (e.g., to police protected areas, stop illegal logging) in the face of strong economic and demographic pressures on environmental resources. As yet, however, efforts at mobilizing conservation finance through markets have met with only modest success. The evolving global carbon markets provide an opportunity to scale up the levels of finance for biodiversity conservation to the extent that measures designed to protect biodiversity and those to sequester carbon are mutually consistent.

The article proceeds as follows. The next section briefly discusses the prevalent models governing efforts to conserve biological diversity and to address climate change, respectively, pointing to the limitations of existing models from the perspective of capturing the joint benefits of biodiversity conservation and carbon storage. The article then touches on the new incentive and financing mechanisms, and on the new political coalitions which

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could contribute to realizing a closer alignment of biodiversity and climate change goals. Particular attention is given to tropical forests as rich biodiversity habitats and to current initiatives to provide financial incentives for reducing greenhouse gas emissions from deforestation. Some technical issues involved in linking carbon finance with biodiversity finance in this way are then briefly examined. Next, social equity issues involved in implementing the proposals under consideration are examined. The article concludes with a summary of the arguments and a few observations on areas for further research.

2. Current models and their limitations

Biodiversity conservation and climate change mitigation share a number of common features. Both involve supply of global public goods and require coordinated global action. In both cases the supply depends to a considerable degree on the actions of sovereign states and private actors within them. In the case of habitat for terrestrial biodiversity, governments regulate land use, but within those broad parameters private actors decide what sort of land use is most rewarding. Moreover, government regulation in this area is often hampered by weak enforcement. Thus, if a tropical forest is not protected by law, and sometimes even if it is, and if the timber market and/or agricultural market price incentive to clear cutting is strong, there is a high probability that the habitat will be destroyed or degraded. Clear assignment and enforcement of property rights can serve to create incentives for sustainable timber harvesting instead of clear cutting, but where biodiversity conservation and other services provided by the forest ecosystem are not priced, harvesting will be excessive and such services will be undersupplied.

In the case of both biodiversity and climate change, effective action depends on the agreement and cooperation of sovereign states. In turn, national governments must put in place legislation and regulations to implement any resultant treaty obligations. Ultimately, delivering the global public goods of biodiversity conservation and climate stabilization depends on influencing the preferences and behaviours of multiple individual and group actors.

2.1. Conventional approach to conservation

Conservation efforts in developed countries have involved a combination of *in-situ* measures—publicly designated nature reserves (e.g., national parks), conservation set-asides (e.g., through the creation of trusts to purchase land of significant conservation value), and biodiversity corridors—and *ex-situ* measures like zoos, botanical gardens and gene banks. As the focus of conservation efforts increasingly has shifted to developing countries and remaining global biodiversity hotspots, new approaches have been needed. In particular, it has been necessary to address the difficulties of protected area management in the context of extreme poverty and population pressures on scarce land and other natural resources. Mixed-use buffer zones surrounding parks and community-based forest management schemes have been employed in response to this challenge.

Traditionally, the financing of biodiversity conservation has been based on a donation-driven model (Swingland et al., 2002). Together with networks of national parks in many countries, one of the most important contributions to biodiversity conservation comes from ENGOs and the private philanthropies and individuals who support them. The Convention on Biological Diversity, in Article 20, calls for new and additional resources to be made available by developed countries to finance the establishment of protected areas in developing countries, but, as Barrett (2003) notes, few resources have been made available for this purpose. A new study (Hicks et al., 2008) finds that, with governmental endorsement of Agenda 21 at the Rio Conference on Environment and Development (UNCED) in 1992, biodiversity conservation received higher global visibility and increased development assistance. Donor support for biodiversity projects rose from $47 million in overseas development assistance (ODA) between 1980 and 1989, to $2.3 billion between 1990 and 1999. Still, this represents only about one-eighth of what the authors of Agenda 21 estimated would be needed from the international community to implement the proposed conservation measures.

2.2. Conventional approach to climate change mitigation

The international climate change policy regime as codified in the Kyoto Protocol is based on targets and timetables—i.e., to keep greenhouse gas emissions during the control period, 2008–2012, to within *x%* below or above a base-year level (usually 1990)—applicable to only a subset of emitters, viz., the Annex 1 (industrialized) countries. In this respect, it is different from the Montreal Protocol on ozone-depleting substances, which mandated a complete phase-out of controlled substances by all Parties, but with developing countries granted a grace period and financing from a dedicated fund to facilitate compliance. Integral to the Kyoto framework are so-called flexibility mechanisms which permit Annex 1 countries to meet targets through trading of carbon credits in an international market. The use of market mechanisms is a relatively recent innovation in environmental policy, with the first large-scale use of emissions trading enshrined in the US Clean Air Act Amendments of 1990, authorizing trading of sulphur dioxide (SO_2) emission credits among power plants.

Carbon markets are a central feature of the present international regime to combat climate change, and developing countries can participate in those markets as suppliers of carbon credits (called certified emission reductions—CERs) through the clean development mechanism (CDM). These project-based credits may come from a variety of investments, including in energy-efficiency improvements, renewable energy, landfill methane and reforestation and afforestation projects. Presently, however, there is no crediting of actions to avoid the release of carbon from destruction (or degradation[1]) of existing forests—referred to as reduced emissions from deforestation (RED, or REDD when forest degradation is included). Yet, deforestation and associated land-use changes account for approximately one-fifth of annual greenhouse gas emissions.

RED has been excluded from the CDM for a variety of reasons. These include: the problem of defining an appropriate baseline, or reference emission level from deforestation; uncertainty about the additionality of credits because of the possibility of domestic carbon leakage (where protection of forest in one location is offset by accelerated deforestation elsewhere); uncertainty about the permanence, or durability, of credited reductions (e.g., what happens if a credited forest is then felled or destroyed by a forest fire?); liability in the event of non-permanence; the risk that large forest-related carbon credits would retard the transition to a low-carbon energy system by depressing the world carbon price; concern of some countries that national sovereignty over their forest resources could be compromised by integrating them within global carbon markets (Olander and Murray, 2007). Methodological work ongoing under the auspices of the United

[1] Carbon emissions from forest degradation pose more complex measurement problems than those from deforestation. There is thus disagreement about whether (and how) to include avoided degradation in an incentive regime.