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Avoiding deforestation in Panamanian protected areas: An analysis of protection effectiveness and implications for reducing emissions from deforestation and forest degradation

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ABSTRACT

Reducing greenhouse gas emissions from deforestation and forest degradation (REDD) is likely to be central to a post-Kyoto climate change mitigation agreement. As such, identifying conditions and factors that will shape the success or failure of a reduced deforestation scheme will provide important insights for policy planning. Given that protected areas (PAs) are a cornerstone in forest conservation, we draw on interviews and secondary data to analyze the effects of available PA resources, governance ability, the level of community involvement, and provincial deforestation rates on land-cover change in nine PAs in Panama. Our results illustrate that coupling surveillance measures with greater funding and strong governance are paramount to reducing deforestation. Alone, however, these factors are insufficient for forest protection. We argue that conservation approaches that complement effective surveillance with community participation and equitable benefit sharing will address the wider issues of leakage and permanence.

1. Introduction: avoiding deforestation and protected areas

In the last decade, climate change mitigation has received much international recognition, most notably with the implementation of the Kyoto Protocol under the United Nations Framework Convention on Climate Change (UNFCCC). Deforestation, occurring primarily in tropical forests, is a prevalent and, until recently, overlooked source of greenhouse gas (GHG) emissions, accounting for up to one-third of global emissions (Houghton, 2005). In 2005 at the 11th Conference of Parties to the UNFCCC (COP 11), Papua New Guinea and Costa Rica pushed for the establishment of a mechanism to address deforestation. Such a mechanism, either market-based or fund-based, would constitute a relatively inexpensive means to reduce non-energy sector GHG emissions and to encourage broader participation in climate change mitigation by generally poorer forest-endowed non-Annex I UNFCCC states (Luttrel et al., 2007; Stern, 2007; Forner et al., 2006; Santilli et al., 2005).

Reduced emissions from deforestation and forest degradation (REDD) was a hot topic at COP 13 in Bali in December 2007 and in COP 14 in Poznan in December 2008 and is likely to be central to a post-2012 climate agreement (Skutsch and Trines, 2008). Notwithstanding the enthusiasm surrounding the prospect of such a scheme, no substantial movement has been made on the details of the REDD mechanism(s) to be adopted (Skutsch and Trines, 2008); thus, uncertainty relating to the architecture of the mechanism remains. Decisions need to be made regarding the

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nature of carbon buyers (industrialized countries, companies, organizations, individuals) and sellers (national or sub-national government, private projects), the mode of financing (market or non-market), the compensation scheme (government regulated or direct flow to deforestation stakeholders), as well as the type of land use targeted (pristine forests or degraded lands) (Skutsch and Trines, 2008). The specifics of a REDD mechanism, expected to be readdressed before or at COP 15 in December 2009, will need to be critically assessed if REDD is to be effectively implemented.

A number of environmental policy instruments such as sustainable forest management and forestry certification, payment for ecosystem services, fiscal and trade policies, and the designation of protected areas (PAs) have been used to counter deforestation threats in the context of biodiversity conservation (Wunder, 2005). PAs have been particularly central to forest conservation efforts (UNEP and WCMC, 2008; Sánchez-Azofeifa et al., 2003); yet with additionality being a fundamental stipulation of climate change mitigation projects, it remains uncertain as to whether previously established PAs will be eligible for REDD (Skutsch and Trines, 2008). Additionality refers to carbon emission reductions that would be in excess of those that are all ready in place. For several tropical nations, much of the remaining intact forests are bound up in PAs or other derivatives thereof; thus PAs, if accepted for REDD, could play a key role in state-led initiatives by committing forests as carbon reservoirs (Forner et al., 2006).

Before engaging in an international REDD agreement, tropical forest nations will need to evaluate their ability to curb deforestation, pinpoint factors that will guarantee permanence – the sustained and effective protection of forest carbon – and develop strategies to circumvent leakage – the displacement of deforestation to relatively unprotected areas. A nation's ability to avoid deforestation within its PAs could be used as a good primary gauge of the country's capacity to protect forest biomass under a REDD scheme.

We use Panama as a case study to investigate the effectiveness of PAs at conserving forest integrity. If these PAs are performing well, implementation of a REDD agenda could promote their use and increase the prominence of PAs within a suit of tools to reduce GHG emissions. If they are failing to avoid deforestation, an analysis of the factors and the underlying dynamics driving these failures will identify strategies most likely to contribute to effective forest carbon conservation. Consistent with the objectives of REDD, we define PA "effectiveness" as the maintenance and/or the increment of mature forest cover within PA boundaries. We draw on interview data relating to available PA resources as well as indicators of PA governance and community–PA rapport to evaluate the effectiveness of nine Panamanian PAs (Fig. 1). The three categories used in this study represent the main theoretical pillars of protection capacity: resources (staff, funds, and infrastructure), governance (political support, legislation, and management design) and community rapport (awareness and support) (Hockings et al., 2006).[2]

2. Case study context: protected areas and management approaches in Panama

Effective PA protection is seldom easy for industrializing states, especially when faced with extreme poverty, growing populations dependent on agriculture, limited financial resources, corruption and oftentimes political instability and conflict (Naughton-Treves et al., 2005). In Panama, conservation efforts occur within a context of unequal arable land distribution (Contraloría, 2003), rapid rural population growth and poverty, laws that afford land titles via forest clearing and the existence of vast tracts of unprotected forests (ANAM, 2003a). Such contexts not only restrict the state's capacity to effectively protect but also contribute to deforestation (Peskett et al., 2006; Lambin et al., 2003; Geist and Lambin, 2001). Such circumstances can explain the fragility of many established and newly formed PAs that are unable to limit deforestation within their boundaries.

Historically, Panama's PA management strategies worked to counter the anthropogenic pressures exerted on ecosystems by applying top-down, 'command and control' measures—an often coercive, state-lead approach to protection that maintains ecological integrity at the expense of local resource use. While this model has been effective under certain conditions (the United States National Park System for example), the exclusionary ideology upon which 'command and control' is based has been rebuked for failing to address many of the underlying causal factors of environmental degradation in tropical industrializing areas (Lambin et al., 2003; Geist and Lambin, 2001). Consequentially, top-down resource management has been linked to marginalizing poor populations and exacerbating natural resource depletion (UNEP and WCMC, 2008; Griffiths, 2007; Luttrel et al., 2007; Peskett et al., 2006; Wunder, 2005).

Faced with these realities, Panama has begun to move away from the 'command and control' model and adopt alternative community-based conservation approaches. This school of conservation philosophy is founded upon devolution of PA management and some level of relinquishment of state authority to actors at the local scale (communities and/or non-governmental organizations (NGOs)) (Vedeld, 1996). These programs can be structured in a variety of formats to offer participating communities indirect benefits from conservation, such as land ownership rights, market access, infrastructure, social and technological capital, etc. With these benefits in mind, some community-based models work to explicitly merge their mandates with 'green' development strategies to serve some of the overlapping interests of both development and conservation programs.

While community-based PA protection approaches reduce the social costs of conservation (Igoe, 2004; Brockington, 2002), conflicting conclusions are still being drawn as to which management strategy (top-down versus bottom-up) can best achieve conservation goals (Hayes and Ostrom, 2005; Locke and Dearden, 2005; Putz et al., 2001; Rice et al., 1997). For example, Bruner et al. (2001) finds PA effectiveness in tropical regions to be significantly related to enforcement measures, but not community participation. In direct response to these findings, however, Hayes (2006) offers evidence to argue that community-managed PAs are equally if not more effective than centralized, traditionally managed PAs. Because community-based approaches may better address the pressures underlying deforestation than a 'command and control' model, they offer the prospect of offsetting the threat of leakage when establishing measures to produce GHG emissions' credits under REDD.

Panama is currently working to apply a new conceptual conservation paradigm: payment for ecosystem services. The rationale behind this approach lies in the creation of economic incentives for conservation and, as in the case of ecotourism, the generation of alternative livelihood options to forest-dependent communities (Wunder, 2005; Gossling, 1999; Ruschmann, 1992).

[2] Hockings and colleagues (2006) define these factors as the basis for the capacity to effectively manage PAs. Under REDD, forest conservation would be a principal PA management objective, thus we use their criteria as a benchmark to study the capacity to protect.