Maximizing biodiversity co-benefits under REDD+: a decoupled approach

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Received 31 October 2012
Accepted for publication 24 April 2013
Published 9 May 2013
Online at stacks.iop.org/ERL/8/024019

Abstract

Current debates on biodiversity co-benefits under REDD+ are marked by considerable ambiguity and contention. Nevertheless, REDD+ continues to represent one of the most important opportunities for global biodiversity conservation, and the question of how best to achieve biodiversity co-benefits remains an important one. Thus far, most biodiversity conservation in the context of REDD+ is predicated on the notion that services are co-located on a landscape. In contrast, this letter argues that decoupling biodiversity and carbon services on a landscape through national-level planning is a better approach to biodiversity conservation under REDD+. We discuss the fundamental ecological differences between the two services and use principles of resource economics to demonstrate that a decoupled approach will be more efficient, more flexible, and better able to mobilize sufficient finance for biodiversity conservation than a coupled approach.

Keywords: conservation, ecosystem services, carbon, forest management, landscape-level planning, tropical forests

1. Introduction

Carbon and biodiversity conservation do not necessarily go hand-in-hand. The scientific and policy communities recognize this fact and addressing it has been at the forefront of negotiations over REDD+, the UNFCCC program aimed at Reducing Emissions from Deforestation and Forest Degradation in developing countries. However, while the need for biodiversity safeguards is widely recognized, the need for biodiversity co-benefits—benefits beyond a safeguarded baseline—is considerably more ambiguous, as well as considerably more contentious.

Various questions remain: is biodiversity conservation integral or irrelevant to REDD+? Should its costs be externalized from or internalized into future funding mechanisms? Where, how, and by whom should biodiversity co-benefits be pursued?

Recognizing ‘loose guidelines, uncertain funding and a lack of consensus’ around these key questions, Phelps et al. (2012b) posit that biodiversity co-benefits may ultimately only be achieved through country-specific and voluntary measures. We agree that this is likely. Nevertheless, REDD+ remains one of the most important opportunities for global biodiversity conservation (FAO 2010, Harvey et al. 2010). Thus, the question of how to best achieve biodiversity co-benefits under REDD+ remains an important one.

In this letter, we argue that determining the best approach to biodiversity conservation under REDD+ requires a careful consideration of why carbon and biodiversity conservation are not more easily interlinked. We explain this disconnect in terms of fundamental ecological differences between carbon and biodiversity. Building from this observation, we summarize existing approaches to biodiversity conservation under REDD+. These discussions support our argument for a decoupled approach to biodiversity conservation under REDD+. 

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Under a decoupled approach, we envision biodiversity and carbon conservation being planned for, managed, and conserved across a landscape under the banner of a single REDD+ program and a single REDD+ payment stream, but using a spatially explicit approach that does not necessitate the two services be spatially co-located. We use evidence from resource economics and conservation biology to demonstrate that this decoupled approach will be more efficient, more flexible, and perhaps better able to mobilize funds for biodiversity conservation than will other approaches being proposed. While making this argument, however, we also recognize the important social considerations that go hand-in-hand with any discussion of REDD+: concerns that relate to how REDD+ will affect broader trends in resource governance and associated poverty, livelihoods, and equity outcomes (see, e.g., Angelsen 2009, Phelps et al 2010). We reflect on these concerns in relation to a decoupled approach in our closing section.

2. Carbon and biodiversity: different ecological entities

Carbon and biodiversity differ in how they are defined as well as in their substitutability. As a chemical element, carbon has a clear, universal definition. More importantly, carbon dynamics in a forest are determined by the environmental factors that control local tree growth and death (e.g., microclimate, physical and chemical soil properties) and do not affect the carbon dynamics in other forests more than a few kilometers away (Swaine et al 1987, Yáñez-Espinosa et al 2006). This means that while different carbon trading schemes trade carbon credits under various names (e.g., certified emission reductions), carbon and carbon credits are substitutable and transferable. There is one common carbon currency, and carbon losses in one area can be acceptably compensated for with carbon gains in another area (Phelps et al 2012a).

In contrast, no one currency (or even definition) exists for biodiversity (Magurran and McGill 2010). Scientists are still working to understand its taxonomic, phylogenetic, genetic, and functional aspects (Devictor et al 2010, Raven et al 2011). These different definitions and aspects make biodiversity inherently non-substitutable. For instance, Forest et al (2007) showed that in South Africa’s Cape Floristic Region, a well-known biodiversity hotspot, floral taxon richness and phylogenetic diversity are not co-located. Even when managers focus only on taxonomic diversity, biodiversity conservation involves tradeoffs; the ranges of target taxa may not overlap (Kremen et al 2008). Finally, individual taxa are irreplaceable entities when it comes to our need to preserve them for their inherent values (e.g., aesthetic, existence, and spiritual), evolutionary potential, and option value (Pearce and Moran 1994, Forest et al 2007, Jachak and Saklan 2007, Justus et al 2009). This means that biodiversity conservation is non-transferable, and as Phelps et al (2012a) highlight, non-transferability raises ethical issues associated with compensating for biodiversity loss in one area by conserving biodiversity in another. In short, and for various reasons, the ecological differences between biodiversity and carbon suggest that the strategies employed to best manage biodiversity on a landscape will inherently differ from those required to best manage carbon on a landscape.

3. Biodiversity co-benefits under REDD+

Biodiversity safeguards are now well agreed-upon in the context of REDD+ negotiations (Phelps et al 2012b). However, it is much less clear how biodiversity co-benefits should be approached under REDD+. The approaches to achieving biodiversity co-benefits that have been posited differ in various dimensions—from how they are funded, to the scale at which they are planned, to how interconnected they consider biodiversity conservation and carbon storage to be (UNEP-WCMC 2008, Strassburg et al 2010, Gardner et al 2012, Phelps et al 2012b). However, while diverse approaches are advocated, the approach that predominates in both literature and practice is coupling.

Coupling occurs when a single payment is made in exchange for a bundle of combined services; this approach is predicated on the notion that ecosystem services are co-located on a landscape. We thus term many current approaches to REDD+ to be coupling due to the way in which they imply biodiversity can be managed as a service that goes hand-in-hand with carbon across a landscape (Cerbu et al 2011). In the context of REDD+ as it currently stands, coupling is predominantly, though not exclusively, practiced on a project-by-project basis. Beyond just ensuring biodiversity safeguards are met, projects such as the Juma Sustainable Development Reserve in Amazonas State, Brazil actively seek to deliver site-specific biodiversity co-benefits. To demonstrate biodiversity conservation, credits are certified by the Climate, Community and Biodiversity Alliance (2008).

Coupling has been advocated or implied by various authors as a way of structuring biodiversity conservation if and when a REDD+ mechanism is finalized and national-level implementation begins (UNEP-WCMC 2008, Strassburg et al 2010, Gardner et al 2012). Under a standard approach, national planners would likely first identify hotspots for carbon conservation and then try to identify areas of biodiversity conservation concern among those carbon hotspots. Other ideas of coupling do not necessarily refer to simple co-location alone. Within the context of coupling, Venter et al (2009) propose the idea that carbon credit buyers could pay a premium for biodiversity conservation, or that conservation groups could subsidize carbon credits in biodiversity areas, so that biodiversity conservation would be better included in REDD+. Spergel and Wells (2009) discuss utilizing conservation trust funds to manage and distribute carbon funding toward carbon projects that include high biodiversity co-benefits. However, while these approaches vary in the stringency with which they assume co-location, they do not ultimately go the full step we are advocating, which is to plan the two services separately at the national level.

2 Under a utilitarian approach to biodiversity conservation, one exception to this argument is functional redundancy, which makes biodiversity somewhat substitutable in respect to ecosystem services.
4. Decoupling biodiversity and carbon for better outcomes

We agree that coupling carbon and biodiversity conservation on a project-by-project basis will benefit biodiversity above and beyond a safeguarded level (e.g., Miles and Kapos 2008, Venter et al 2009, Strassburg et al 2010). We further agree with the many practical arguments in support of a coupled approach, particularly where the capacity to conduct national-level planning is weak (Phelps et al 2012b).

Nevertheless, the fundamental ecological differences between carbon and biodiversity mean that coupling almost necessarily leads to sharper tradeoffs between carbon and biodiversity conservation than would a spatially explicit approach (Levin et al 2008, Miles and Kapos 2008, Hirsch et al 2011). A good demonstration of these sharp tradeoffs comes from Paoli et al (2010), who showed that the most carbon rich forests in Indonesia (peat swamps) do not overlap with the most species-rich areas or the areas with the most threatened species. In this example, REDD+ activities in high biodiversity areas may be avoided altogether, potentially forgoing major opportunities for biodiversity conservation. Southeast Asian dipterocarp forests tend to be richer in carbon than other tropical forests, thus making the tradeoffs between biodiversity conservation and carbon sequestration starker than might be seen in other regions; nonetheless, this example highlights the tradeoffs that often exist.

In light of this, we advocate decoupling—optimally locating both carbon and biodiversity services on a landscape in a spatially explicit manner—as an alternative approach that better accommodates the ecological mismatches between carbon and biodiversity when and where planners are interested in using REDD+ to catalyze biodiversity conservation. We term this approach decoupling, reflecting the idea that biodiversity and carbon conservation can be planned for, managed, and conserved separately and spatially explicitly on a landscape under the banner of a single REDD+ program and a single REDD+ payment stream. The alternative approach we support does not necessarily involve de-aggregating carbon and biodiversity payment streams. However, it does involve explicitly disaggregating carbon and biodiversity services themselves.

While various authors have alluded to such an approach (Gardner et al 2012, Phelps et al 2012b) and have provided substantiating evidence for its utility in overcoming the disconnect between biodiversity and carbon (Venter et al 2009, Larsen et al 2011, Strassburg et al 2012), decoupling has not yet been fully delineated or taken seriously as an approach to biodiversity conservation under REDD+. Below, we aim to describe what it might entail as well as its relative strengths as a possible approach. Our argument also builds on previous warnings against focusing too narrowly on individual ecosystem services (e.g., Butchart et al 2012).

5. Why decouple?

Based on the arguments below, we assert that using decoupling to guide REDD+ at the national level will often realize higher overall biodiversity benefits than would coupling, while maintaining carbon benefits. This is because a decoupled approach would explicitly recognize the value of an individual project in terms of how it contributes to national targets for carbon and biodiversity and allows for payments to be structured accordingly. Thus, decoupling would involve planning potential land uses and REDD+ actions at the national level and allowing the disaggregation of specific activities for carbon and biodiversity conservation on a landscape as needed. Such disaggregation would make possible actions that focus on both carbon and biodiversity, as well as those that solely focus on carbon or solely on biodiversity. This would be similar to current proposed REDD+ approaches because, unless biodiversity co-benefits (not just biodiversity safeguards) are required by all REDD+ projects, REDD+ would make possible coupled actions that focus on both carbon and biodiversity as well as projects that solely focus on carbon and do not address biodiversity conservation. The key difference is that decoupled projects that focus on biodiversity and carbon would conserve biodiversity across a landscape in a much more efficient, flexible, and optimal way than similar coupled projects.

First, decoupling services explicitly acknowledges that major spatial and temporal tradeoffs may exist between activities aimed at conserving biodiversity and those aimed at conserving carbon. Findings in resource economics and spatial conservation planning indicate that exploiting these tradeoffs often leads to more efficient outcomes. For example, in forest management, inherent economic and ecological nonlinearities (e.g., fixed costs and species’ spatial aggregations, respectively) often lead to situations where segregating timber production and biodiversity conservation in different locations is superior to integrating timber production and biodiversity conservation at the same location (Vincent and Potts 2004, Potts and Vincent 2008). In the context of REDD+, Venter et al (2012) demonstrated that spatial planning can meet REDD+ targets for Indonesian Borneo while minimizing conflicts with agricultural expansion and logging. Coupling does not motivate segregated management approaches, making suboptimal management outcomes likely. In contrast, decoupling acknowledges that the whole is often greater than the sum of the parts, allowing for management interventions that maximize the conservation of biodiversity for a given level of carbon sequestration or vice versa. In economic terms, this means that outcomes move closer to the carbon–biodiversity production possibilities frontier, where carbon services and biodiversity conservation are produced with maximal efficiency.

Second, decoupling allows for diverse types of biodiversity benefits to be incorporated into REDD+ activities planned at the national level, rather than subsuming activities under a diluted catch-all of ‘good for biodiversity’. For example, activities at the forest frontier may focus on

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3 We use the term ‘decoupling’ to prevent conflating our proposed approach with ‘stacking’, a term used in the payments for ecosystem services literature to refer to disaggregated services and, importantly, disaggregated payment streams. While some biodiversity finance may be independent of overall REDD+ funds and managed in the context of REDD+, this is not necessary to the approach we suggest.
ecosystem services that benefit adjacent agricultural fields, such as pollination services (Garibaldi et al 2011), whereas activities in areas where taxonomic richness and phylogenetic diversity are decoupled (Forest et al 2007) may emphasize spatial planning to conserve both aspects of biodiversity. The design of specific activities may also aim to enhance recreational opportunities.

One potential criticism of the decoupled approach we are advocating is that by spatially separating carbon and biodiversity, decoupling would place carbon and biodiversity on the market as two entirely separate products. The fear would be that since the market prefers low-cost carbon abatement, funding would not go voluntarily to biodiversity co-benefits and biodiversity would not be conserved. However, this argument fails to realize that the risk that biodiversity will not be conserved under REDD+ exists equally regardless of whether biodiversity is coupled or decoupled. As we explained above, unless biodiversity co-benefits are always required of all REDD+ actions (which we do not believe to be a likely eventuality), both coupled and decoupled approaches to including biodiversity conservation under REDD+ make possible projects that focus on both biodiversity and carbon or those that focus solely carbon. Thus, even under coupling, the market can favor low-cost, carbon-only abatement, avoiding projects that include biodiversity co-benefits (provided of course that they do not violate social or biodiversity safeguards). We acknowledge this reality, but argue that when carbon funds do get directed toward conservation under REDD+, the resulting biodiversity conservation should be planned and executed in the most effective and efficient way possible. Additionally, since all REDD+ investments are subject to biodiversity safeguards, decoupling does not introduce risks to biodiversity above and beyond those of a coupled approach.

Finally, decoupling carbon and biodiversity services at the intervention level under REDD+ actually has the potential to both better mobilize and more efficiently use much-needed REDD+ finance than coupling would (Conservation International 2010). Not only would decoupling incentivize investors generically interested in carbon by still allowing them to invest in predominately carbon sequestration projects, it could also incentivize biodiversity-focused investments by flexibly allowing investors to vary the relative value of carbon and biodiversity services and to pursue the aspects of biodiversity conservation in which they are most vested. Finally, it could necessitate biodiversity-focused investments if national-level biodiversity safeguards become binding. This would not exclude funding that already exists for coupled carbon and biodiversity outcomes (such as from the Government of Norway); it just advocates that biodiversity outcomes of these funds be judged at the national level. Decoupling would allow markets and governments to search out efficient options for meeting both objectives (something facilitated by movement toward more diversified funding for REDD+ at Doha in 2012). Again, the payment streams would not necessarily need to be separate, but an advantage of decoupled planning is that biodiversity-only finance could be more easily integrated into a framework of national-level planning and safeguards.

Decoupling may also seem to raise additional social risks: in a context of increasingly decentralized and devolved forest resources (Agrawal and Ostrom 2008), would an explicitly national-level approach to REDD+ reverse these trends? Could national-level REDD+ policies recentralize forest resources by taking power from the owners and managers of forests at the local level and giving it to states? This is the important critique that Phelps et al (2010) level against REDD+. Yet importantly, this critique applies to REDD+ in all of its formulations and is not exclusive to decoupling. This is particularly true given the broad debates about how and why national-level planning for REDD+ is necessary for REDD+ to succeed. Advocates of national-level REDD+ planning cite that drivers of forest loss operate at the international level (e.g., timber demand) in ways that cannot be adequately addressed on a project-by-project basis (see e.g., Spergel and Wells 2009). This has led to the evolution of REDD+ toward its second phase (national-level planning, targets, and implementation). Our argument for decoupling is not in any way intended to discount the important critique of REDD+’s propensity to centralize forest governance and management. However, we point out that these challenges already exist for all REDD+ carbon policies even before biodiversity is brought into the discussion. We do believe that with or without decoupling, there is a sustained need for policymakers and practitioners to advocate for and work toward transparent and participatory planning processes, processes that in the best sense can be used as tools to explicitly identify and discuss diverse options to foster dialog and include previously excluded actors (Hirsch et al 2011).

The recent movement toward national-level REDD+ policies we discussed above points to the fact that decoupling is becoming all the more possible as time progresses. While decoupling is conceptually new, the institutional framework needed to achieve it is largely in place. The Cancún Agreements already require national-level carbon monitoring, reporting, and verification, which include on-the-ground assessments of REDD+ activities; this provides the infrastructure that makes national-level biodiversity conservation planning feasible (see Gardner et al 2012). In addition, a decoupled approach will best accommodate the various methods currently used to assess tropical biodiversity. Due to the flexibility of a decoupled approach, the aspects of biodiversity that can be reasonably and cost-effectively measured may be emphasized, while those that cannot be reliably assessed at this time can be deemphasized. Finally, CBD National Biodiversity Strategies and Action Plans are gaining momentum (Angelsen 2009, Convention on Biodiversity 2012), and many, if not all, national-level Convention on Biological Diversity (CBD) plans already include spatial prioritization (Convention on Biodiversity 2012). These spatially explicit ways of assessing and monitoring carbon and biodiversity could be mobilized to allow for optimal management outcomes through a decoupled approach to biodiversity conservation under REDD+. In short, national-level biodiversity conservation under REDD+ is imperative and represents an opportunity to improve upon the global biodiversity conservation efforts of...
the past several decades. Decoupling biodiversity and carbon services is the best way to accomplish this.

Acknowledgments

The authors would like to thank P S Ashton, D Ganz, E Meeijsaard, M Luskin, and K Kitzes for valuable input on early drafts. LCK and HMD were both supported by National Science Foundation Graduate Research Fellowships.

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