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Safeguards, Standards, and the Science-Policy Interfaces of REDD+: Greening Land Use Through Forest-Based Mitigation in Costa Rica?

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Abstract

This article looks at the evolving concept of "Green Economy" and its potential synergies and trade-offs with biodiversity governance and land use management. By analyzing the accelerating debate and institutionalization of forest-based mitigation projects that are inclined to market-based funding in developing countries through Reducing Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries (REDD+), this study aims to critically engage with the promises of a Green Economy that have been purported internationally. We empirically analyze the global development of REDD+ safeguards and standards with a special focus on the role of science–policy interfaces and monitoring, reporting, and verification. These outlines are projected to the exemplary case of Costa Rica, a front-runner in developing land use approaches with a strong reputation for conservation and sustainable forestry.

Keywords

REDD+, biodiversity, Green Economy, land use, safeguards, Costa Rica

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Introduction

This article looks at the evolving concept of "Green Economy" (GE) with a focus on its meaning and implications for land use and biodiversity. We review the ramifications of this matter as it pertains to the mechanism "Reducing Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" (REDD+). By analyzing the accelerating debate and institutionalization of forest-based mitigation projects that are inclined to market-based funding in developing countries through REDD+, this study aims to critically engage with the promises of a GE that have been purported internationally (e.g., by attributing it with instantaneous sustainability qualities) and its actual empirical manifestation at the national level. Even though there are strong and direct links between forest protection, carbon storage, and biodiversity conservation, there still seems to be no agreed understanding of how biodiversity fits within the framework of GE (Gasparatos & Willis, 2015). Hence, our analysis speaks directly to two major concerns of this special issue: (a) What are the possible co-benefits and when do trade-offs and tensions occur between policy instruments on climate change and biodiversity that are related to a GE approach, and how are they debated in the science-policy process? and (b) How are they responded to domestically and with which consequences, here, for conservation and livelihoods of local people? We argue that the negotiation of safeguards and co-benefits as well as their translation into standards in the implementation phase shape the emerging governing structure of a GE.

The empirical illustration builds on results from fieldwork in Costa Rica, a country that is both highly diverse in biodiversity and has been a front-runner country in terms of establishing Payments for Ecosystem Services (PES) and REDD+. Hence, it is a crucial case to investigate under which circumstances and how REDD+ may interact with broader GE and ecosystem policies. To approach this issue, we complement our own empirical research from 2013, 2016, and 2017 (interviews with conservationist and forest production actors, government staff, and consultants) with an additional desk study and review of other academic and gray literature.

The official mandate of REDD+ is to include conservation and sustainable management of forests alongside the fostering of their carbon storage potential. This is a relevant issue also in a GE context, for the main drivers of deforestation are the conversion of forests to agricultural land for commercial as well as for subsistence use, commercial and illegal logging, and the conversion of land into plantations to grow biofuels. This leads to an estimated annual emission of CO_2 of 5.8 billion tons (Levin, McDermott, & Cashore, 2008). However, evolving carbon markets—which ultimately very often target indigenous peoples' traditional lands and territories—often fail to value biodiversity and local livelihood values, presumably because there are stronger economic incentives to prefer

carbon capture through plantations rather than carbon storing through conservation and forest protection. In addition, REDD+ provides private actors with wide opportunities to negotiate deals with indigenous peoples, but, as these groups often still lack recognized control over their areas, there is a perceived need for some form of state intervention to protect their rights (Aguilar-Støen, 2017).

International provisions to support national REDD+ strategies have been established as early as 2008 when the United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD Programme), a joint program of the United Nations Environment Programme (UNEP) and the United Nations Development Programme, was set up. Since then, a complex network of actors and institutions has evolved that accompanies and influences the science-policy process of research, monitoring, assessment, and strategy development related to REDD+. Hence, the mechanism is also a useful case to assess the architecture of actor constellations and the dynamics between state and nonstate agents across scale. But even though the prevention of negative externalities and the fostering of synergies have become a recuring theme in those institutions, the general empirical lessons imply that the focus on carbon capture still predominates in REDD+. But if not considered thoroughly, related socioecological trade-offs that come with PES programs such as REDD+ risk to jeopardize the overall biophysical foundation of a GE writ large.

In this article, we take a critical look at factors that may illuminate this situation. We proceed as follows: In the next section, we review the debate on the linkages among biodiversity, forests, and a GE from various angles. Then, we specify the political and economic context in which REDD+ has evolved. Not least does REDD+ raise enormous (short-term) expectations for external funding with predicted financial flows from North to South reaching up to US$30 billion a year.[1] Moreover, as indicated, the REDD+ readiness process engages a large number of institutions and actors at all levels, including the World Bank Forest Carbon Partnership Facility (FCPF), UN-REDD, and the Food and Agriculture Organization (FAO). This fact leads to the question of how REDD+ programs of international donors and other transnational actors interact with domestic agents and policies. In this article, we are particularly interested in understanding how this interaction plays out with view to reference levels for domestic action related to noncarbon ecosystem services (biodiversity, especially). These are particularly salient with view to standard formulation, baseline and eligibility (for REDD+ finance), as well as for monitoring, reporting, and verification (MRV). The development of those aspects—that may be regarded part of a broader GE approach—is strongly shaped through the multilateral and transnational science-policy interface.

These outlines will be projected to insights from Costa Rica, a country that was not only instrumental in putting the issue of REDD+ on the international

agenda in 2005 but that is also generally acknowledged for its strong performance in conservation and sustainable forest management. Hence, we reflect on how external actors who contribute to the financial and institutional buildup of REDD+ programs may affect domestic policies through diffusion of international ideas and through material resources.

GE, Forests, and Biodiversity: Possible Synergies and Trade-Offs

The forests of the world contain between 50% and 85% of the world's terrestrial biodiversity and contribute to regulating the climate at both local and global scales (Millennium Ecosystem Assessment [MA], 2005). Forests and the biodiversity that they enclose provide a great range of ecosystem services, including goods and services and recreational uses. Forestry includes "all extractive and non-extractive forms of forest management, use and trade" (Petrokofsky, Kanowski, Brown, & McDermott, 2015, p. 32) and can be considered a key sector within a GE. But unsustainable deforestation continues largely unmitigated and accounts for up to 20% of global greenhouse gas emissions (Stern, 2007), which is more than the entire global transportation sector and second only to the energy sector, as well as an estimated annual loss of US$250 billion in ecosystem services (MA, 2005).

However, there is still only poor understanding of how biodiversity fits within a GE, due to one major shortcoming (Gasparatos & Willis, 2015): The role of biodiversity is rarely acknowledged for economic sectors other than agriculture, forestry, fisheries, and tourism. In turn, the link between biodiversity and green economic development, and interesting investment options, is almost solely restricted to these sectors. Also, forest ecosystem services aside of their function as carbon sinks are usually undervalued. Correspondingly, loss of biodiversity—which is no less a problem than its more prominent counterpart, climate change—has attracted less international political attention (Convention on Biological Diversity [CBD], 2010; European Commission, 2008), possibly because it is less amenable to technological solutions and technology transfer (Jänicke & Lindemann, 2010; Neßhöver, Prip, & Wittmer, 2015), it is harder to measure, and it is less visible in the media. Consequently, there is a lack of candidness about the synergies and trade-offs between biodiversity, land use politics such as REDD+, and GE policies. Trade-offs between those issues can be assumed because the social, environmental, and economic pillars of sustainable development cannot automatically be expected to pull in the same direction. We approach the linkages between them by assessing, first, how they have been taken up in the international science–policy interface within the biodiversity community; second, we revise arguments that underpin the relevance of mutually supportive sound biodiversity and forest governance and a GE.[2]

The GE Debate in Global Biodiversity Governance

The preservation of biodiversity and ecosystem services could be considered a key requirement in the transformation toward a GE, particularly when captured within the frame of *natural capital* in the sense that natural resources contribute to the development of an economy (Gasparatos & Stevens, 2015, p. 10). Theoretically, the GE narrative is open to incorporate both the interests of commercial users of biodiversity, for example, the forestry sector and conservationists. However, the standing of biodiversity within a GE framework has not yet been concluded nor has it been systematically addressed in relevant (international) policy documents including the CBD which is the main multilateral framework for this policy area (Gasparatos & Stevens, 2015, p. 11; see also Prip & Wallbott, 2014).

The general ideas of a GE approach or the notion that economic activities and biodiversity concerns could overlap in a synergetic manner have not been taken up in the CBD in the first 20 years of its existence. What prevailed instead was the perception that biodiversity was victim to harmful economic activities and that conservation regulation would impact on economic development (Neßhöver et al., 2015, p. 295). In 2005, the MA provided for a general framework through which biodiversity and the concept of ecosystems could be linked with the prospect of human well-being. This anthropocentric notion highlighted in an instrumental way the direct and indirect benefits that humans could derive from biodiversity. In turn, policy makers started to increasingly discuss the potential contribution of financial mechanisms to conserve biodiversity. Additional momentum was created through the final report of "The Economics of Ecosystems and Biodiversity" initiative, which had been funded by the European Commission, Germany, United Kingdom, Norway, the Netherlands, and Sweden with the goal of "making nature's values visible."[3] The ecosystem services perspective brought a stronger emphasis on the economic aspects of biodiversity and triggered a debate on fiscal reforms or the creation of markets for green products. However, critics also pointed out that this approach might lead to commodification of nature (see later). Yet, the new paradigm with its appeal to the GE debate was powerful enough to also resonate within the CBD and UNEP (Neßhöver et al., 2015) so that it became to be reflected in the CBD Second Strategic Plan for 2020 and the Aichi Targets that were both agreed at the 10th Conference of the Parties (COP) of the CBD in 2010, as well as in the framework for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

Still, though, it remains nebulous how possible trade-offs between biodiversity conservation and economic activities could be resolved. And indeed, the assumption of possibly favorable linkages between economic aspects and conservationist approaches has not remained uncontested. Rather, developing countries in the CBD challenged the idea under the impression that

industrialized countries could attempt to avoid their financial aid obligations by shifting attention to market-based financial instruments (Neßhöver et al., 2015). They were skeptical that the emerging emphasis on voluntary, marked-based funding would instigate a reduced motivation for resource mobilization through public channels (and the developed countries' obligations to provide new and additional resources) for protecting biodiversity. Furthermore, it was a continuous issue of debate how resources mobilization could link up to addressing subsidies and fiscal policies that keep increasing the pressures on biodiversity (Neßhöver et al., 2015). Relatedly, civil society actors have for a long time criticized the idea of "neoliberal environments" (Castree, 2010), the impending capitalist accumulation, and the commodification of nature (see also Liverman, 2004; McCauley, 2006; Mrozowski, 1999). They contest the idea that nature must be sold to be preserved (McAfee, 1999) and the assumption that there could be a win–win constellation of economic growth and sustainability. Rather, it is assumed that "green grabbing" (Corson & MacDonald, 2012; Fairhead, Leach, & Scoones, 2012) occurs. This term depicts a particular form of land grabbing and has been described as "the dark side of the green economy."[4] It denotes those cases in which "environmental agendas are the core and goal of grabs," be it for biodiversity conservation, ecotourism, or offsets (see also Carmody & Taylor, 2016). For a GE is not only characterized by the promise of sustainable economic growth "but also by the fact that the private sector is a major actor charged with changing land use behaviours" (Phelps, 2015, p. 272).

Clearly, then, REDD+ is a pivotal concourse for biodiversity and GE concerns, as it has been developed based on the premise that the private sector would be involved, that private-sector finance could be recruited, and that, possibly, emission offset credits could be purchased on global carbon markets. Interestingly though, the *commercialization of nature* debate has not gained hold to the same extent in the climate change debate—when compared with criticism of bioprospecting—even though it is similarly and inherently characterized by markets, quotas, and commercial interests (Andresen & Rosendal, 2017). Thus, the growth of emission markets has to a much lesser extent been limited by critical arguments accusing countries from the Global North to pay off the poor while continuing their own consumerism.

Acknowledging the Values of Biodiversity and Forests in a GE

If one acknowledges the basic definition that a GE is "one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP, 2011, p. 16) as well as the presumption that all economic activities hinge on ecosystem services, then two implications for biodiversity-sensitive land use governance arise (Willis & Kirby, 2015, p. 19): First, the conservation of biodiversity and the gains that are derived

from it can contribute to human well-being and social equity. To assess this relation, we would need to consider qualitative aspects related to producing and distributing the products, goods, and services that hinge on biodiversity. This involves the organization and governance—possibly through safeguards and standards—of rights-based approaches toward access to and sharing of benefits that are related to biodiversity as well as the burden sharing of maintaining different production systems for ecosystem services (Oberthür & Rosendal, 2014; see also Mace, 2014).

Second, biodiversity could be regarded as a hedge that—once preserved—could reduce environmental risks, ecological scarcities, and, therewith, the long-term funding basis of a GE. More diversity of genes, ecosystems, and species allows for more alternatives in times of crisis and hence reduced vulnerability to external shocks; for example, different plant types reduce the risk of falling victim to a specific disease or pest, thereby ultimately contributing to food security (Willis & Kirby, 2015, p. 26). Furthermore, biodiversity supports the delivery of those ecosystem services, for example, pollination, that underpin productivity and yield, hence having a direct impact on monetary valorization.

The other way around, a GE is likely to impact on biological diversity. A positive impact could stem from ecotourism when high levels of biodiversity are considered an economic asset (Biénabe & Hearne, 2006; Gössling, 1999; Naidoo & Adamovicz, 2005, for a study on PES and tourism in Costa Rica). In contrast, a negative impact is likely to occur when one form of goods and services, for example, carbon storage in monocultures, is overemphasized.

When it comes to forests more specifically, two antagonistic perspectives of the relation between those natural resources and a GE can be identified. On one hand, even though forests cover 4 billion hectares worldwide, equivalent to 31% of the total land area (FAO, 2010, p. 44), the global forestry sector plays a rather marginal role in the global economy in relative terms. In 2011, it employed about 0.4% of the labor force, contributed about 1% to gross domestic product (GDP) and accounted to about 2.4% of global merchandise trade (FAO, 2014, p. 4). More broadly though, tropical forests have an estimated average value of ecosystem services of US$6,120 per hectare each year, and the livelihoods of 1.6 billion people are supported by forests (UNEP, 2014). Still, forest areas are unevenly distributed regionally, and also, their importance varies. Although the production and consumption of forest products have their highest share in North America, Western Europe, and the developed Asia-Pacific region (accounting for around 23% of forest-related employment, half of value-added in the global forestry sector, and 60% of forest products exports; FAO, 2014), other regions are catching up. The Asia-Pacific region, Latin America, and the Caribbean and Eastern Europe registered increasing shares in formal global forestry sector employment (from 63% to 69% between 2000 and 2011) and in global value-added (from 28% to 47%), not least due to a general uptake of the regional economy

(e.g., cheap labor, abundance of forest resources, high rates of economic growth, sector-specific policies to encourage development and investment; FAO, 2014). However, these numbers capture only the formal forestry sector as well as its direct contribution to the economy. What is left aside are both informal forest-based practices as well as the contribution of non-timber forest products to local economics, which are even more difficult to assess but nevertheless of crucial importance to both conservation and development strategies (Heubach, Wittig, Nuppenau, & Hahn, 2011).

On the other hand, forests contribute to sustaining the biophysical and ecological foundations of a GE through various benefits. Forests supply a magnitude of regulative, supportive, cultural, and provisional services (Petrokofsky et al., 2015). They are habitat for approximately two thirds of all terrestrial biodiversity, and they regulate water and carbon cycles. Between 2000 and 2007, the global carbon sink removed 2.5 billion tons of carbon per year from the atmosphere, most of which was accomplished by tropical forests (1.3 billion tons per year) followed by temperate forests (0.8 billion tons per year) and boreal forests (0.5 billion tons per year; Pan et al., 2011).

Furthermore, forests provide for spiritual and recreational spaces that, aside from their intrinsic value to many indigenous and traditional societies, have an economic potential not only in terms of attracting tourism but also in broader terms of livelihood support, for example, by providing fiber, fuel, and wood to local communities. Hence, simultaneously, forest ecosystem services depend largely on the direct and indirect input from biodiversity; inversely, the loss and degradation but also the unsustainable management of forests impact negatively on biodiversity. Although timber estates (production forests) have been found to still display a relatively high value in terms of ecosystem services in general (which cannot be said for other nonpristine, converted land such as agriculture and pastures; Willis & Kirby, 2015, p. 24), they do not score high levels of biodiversity. As Petrokofsky et al. (2015) put it, "the complexity of ecological processes which sustain biodiversity means that protection of forests in as near natural conditions as possible is the cornerstone of biodiversity conservation strategies" (p. 32). While this sheds light on the relevance of protected areas, biodiversity issues also come up in managed or secondary forests, biodiversity corridors, agroforestry models, and landscape approaches (Petrokofsky et al., 2015, p. 32). Moreover, they are linked to marked-based instruments associated with a GE, for which the private sector is (expected to be) involved, including PES schemes, offset mechanisms, product certification, and REDD+ schemes (Neßhöver et al., 2015). Indeed, there is widespread concern that biodiversity has not been given adequate consideration in the REDD+ process, increasing instead the possibility of negative environmental impacts (Gardner et al., 2012; McDermott, Coad, Helfgott, & Schroeder, 2012; O'Connor, 2008). Furthermore, carbon capture is measured through hectares (canopy cover, height, and area), and this assessment does not convey information about the

biological quality of the area. In contrast, though, there have also been insights that there is large potential for synergies between REDD+ and the CBD Aichi Biodiversity Targets and Strategic Plan for Biodiversity 2011–2020 (Bodin, Ravilious, Bastianelli, & Mant, 2014).

In sum, it seems justified to analyze the international development of safeguard systems to protect biodiversity and local livelihoods (*do no harm*) and reward systems to recognize diverse co-benefits (*do good*) associated with forest governance in general and REDD+ in particular. Complementarily, country-level experiences in considering or omitting those matters in land use politics can illustrate opportunities, challenges, and possible policy ramifications that need to be addressed. To contribute to this debate, we assess, in the following, the development of noncarbon safeguards and standards for REDD+ (with a focus on biodiversity) at the international level and corresponding predispositions in Costa Rica.

The Shape of Global REDD+ Politics

The International Script of REDD+

Only between 1990 and 2010, net change in global forest area was estimated at an average −6.75 million hectares per year (FAO, 2010, p. 44). This has implications for biodiversity and forest-dependent communities and contributes to the release of CO_2 into the atmosphere. Thus, in 2007, parties to the United Nations Framework Convention on Climate Change (UNFCCC) decided to consider measures for REDD in developing countries. It is a framework through which developing countries are rewarded financially for any emissions reductions that they achieve through decreasing the conversion of forests to alternate land uses. To have such a measure at global scale was strongly advocated by the Coalition for Rainforest Nations, now known as the Rainforest Coalition, of which Costa Rica is a member. The "+" came in at a later stage to denote the conservation, sustainable management of forests, and enhancement of forest carbon stocks. Herein, the call for a robust safeguard system was key, also justified against the demand for a secure investment system to attract REDD+ finance. At COP16, in 2010, safeguards for biodiversity and livelihoods were included in the Cancún Agreements (Decision UNFCCC 1/CP.16), which also decided on a phased approach to national implementation.[5]

Thus, developing country parties should, according to their national capabilities, develop (a) a national strategy or action plan, (b) a national forest reference emission level or forest reference level, (c) a robust and transparent national forest monitoring system for REDD+ activities, and (d) a system for providing information on how REDD+ safeguards (to avoid negative social and environmental outcomes) are being addressed and adhered to.

The section on safeguards specified that the following seven precautions should be promoted and supported when undertaking REDD+ activities: (a) that actions complement or are consistent with the objectives of national forest programs and relevant international conventions and agreements; (b) transparent and effective national forest governance structures, taking into account national legislation and sovereignty; (c) respect for the knowledge and rights of indigenous peoples and members of local communities, by taking into account relevant international obligations, national circumstances and laws, and noting that the United Nations General Assembly has adopted the United Nations Declaration on the Rights of Indigenous Peoples; (d) the full and effective participation of relevant stakeholders, in particular indigenous peoples and local communities; (e) that actions are consistent with the conservation of natural forests and biological diversity, ensuring that they are not used for the conversion of natural forests but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services and to enhance other social and environmental benefits; (f) actions to address the risks of reversals; and (g) actions to reduce displacement of emissions.

The following COP17 meeting in Durban in 2011 ended with a decision that explicitly linked social and environmental safeguards with the issue of finance. It clearly reiterated the Cancún outcome and the necessity to respect and address the safeguards and emphasized the need to preserve environmental integrity also when developing market-based mechanisms (Draft Decision UNFCCC -/CP.17, COP17, para. 66; see also para. 63, 64, 67). Therewith, a clear relation was developed—despite that so far there is no formalized global market for REDD+—between forest management, biodiversity, and what we call a GE. Still, observers noted that clear rules on reporting and measuring REDD+ impacts were lacking and that, therefore, the safeguards for this type of land use governance were ultimately watered down (Aurora, 2011; Kovacevic, 2011). Yet, guidance on reference levels or reference emission levels provided the basis for a MRV scheme to be established in conjunction with methodological advances. The informal Bangkok meeting a few months later (August 2012) held that biodiversity and human livelihoods should be included in REDD+ on an equal footing with carbon emission reductions. A milestone in developing the script of REDD+ was COP19 in Warsaw in 2013, when parties adopted a comprehensive framework (*rule book*) including guidance for full implementation of REDD+. It clarified, inter alia, requirements for technical analysis and that MRV for REDD+ should be consistent with any guidance for the MRV of nationally appropriate mitigation actions (NAMAs; Decision 14/CP.19). It also established a safeguards information system (SIS; Decision 12/CP.19), thereby linking REDD+ activities to results-based finance.

However, this linkage did not stretch out to the (possibly more proactive) issue of noncarbon benefits. At COP20, the close link between safeguards and

noncarbon benefits, and the relationship between noncarbon benefits and other agreements on forests, biodiversity, conservation, and indigenous peoples, was, indeed, recognized (FCCC/SBSTA/2014/MISC.4; Elias et al., 2014). But in 2015—notwithstanding the agreement that noncarbon benefits are important for the long-term sustainability of REDD+—they were not considered obligatory to receive support or result-based finance (FCCC/SBSTA/2015/L.5/Add.3).

Still, despite the formal progress and institutionalization of safeguards that enhanced their normative bindingess, analysts have repeatedly noted that the actual content of the term has, in fact, not been discussed profoundly in the negotiations (Arhin, 2014; Wallbott, 2014). For REDD+, the international community assumes that safeguards encompass a broad set of principles that should be promoted and supported to mitigate risks. Yet, different ideas, objectives, and understandings embedded in the term might be carried along the way through the different phases of REDD+ preparation and implementation in different countries as the Warsaw Framework has been considered to promote centralization of land use management at the national level by linking MRV processes to reporting obligations under the convention and by providing the opportunity to create a voluntary national entity or focal point for REDD+. This tendency was further strengthened at COP20, when parties and observer organizations expressed strong support for nationally determined benefits (FCCC/SBSTA/2014/MISC.4). At COP21 in Paris, 2015, parties to the UNFCCC agreed on a new global climate regime, of which REDD+ was confirmed as a central element. But the shape of national SIS remains indeterminate, and it is even assumed that ''no global model can be prescribed'' (Swan, 2016). Thus, coordination between sectors and ministries at national scale will become highly important in REDD+ activities (Voigt & Ferreira, 2015), pertaining also to the question under which circumstances a proactive state might actually be able to deliver substantial guidance when striving for a sustainable GE (see Lederer, Wallbott, & Bauer, 2018).

The Sciences Behind REDD+

Altogether, the policy community, notably multilateral development aid agencies, largely welcomed REDD+ along with other types of PES as a more cost-efficient approach to conservation than past community-based conservation efforts. Thus, donors and investors appeared to stronger emphasize carbon and risk mitigation to be central elements of safeguards (McDermott et al., 2012). In light of this type of situation, it has been noted that a high score on cost-efficiency in forest management could have different trade-offs in terms of socioeconomic impacts (Wunder, 2006). What is gained in short-term economic efficiency may be lost in legitimacy among local affected stakeholders, including related to social rights and benefits, and in long-term conservation and

sustainability (Sierra & Russman, 2006). From this, it follows that the choice of organizations to be involved in defining, funding, and verifying safeguard activities, as well as the balance of actors in their governing structures, is likely to influence the relative emphasis on noncarbon values (McDermott et al., 2012).

Science communities can contribute to investigating the interactions between the different dimensions by developing indicators and indices to capture degrees of transformative change (Milla, 2017). Thus, the dominant argument in favor of increasing the role of nonstate actors in global politics is that they provide valuable information and underpin legitimacy in global environmental governance (Bernauer & Betzold, 2012; Betsill & Corell, 2008; Biermann & Gupta, 2011), including through scientific expertise, financial support, and normative argumentation. In a multilevel perspective, the *expert* knowledge that is produced in international networks and forums may translate into policy advice in local arenas (Bumpus & Liverman, 2011). The effectiveness of such science-policy interfaces hinges on credibility, relevance, legitimacy, and iteration (Sarkki et al., 2015). Particularly, technical knowledge is generally regarded as objective, true, and sufficient (Negev & Teschner, 2013) so that policy turns to science with the intention to reduce (concise and policy-relevant) uncertainties and to deliver guidance on how to prevent trade-offs or negative externalities (Wardekker, van der Slujis, Janssen, Kloprogge, & Petersen, 2008; see also Wesselink, Buchana, Georgiadou, & Turnhout, 2013). But developing and applying indicators in a—supposedly—neutral manner is in fact a highly political issue (Hinkel, 2011). Reports, measurements, and experiments are selective—as shown, for example, in the leakage or baseline problems of REDD+—and scientific representations of selective truth claims (Rajão, 2013). Technical knowledge may indeed be disputable, uncertain, and based on problematic presuppositions (Negev & Teschner, 2013). Not only do consultants and scientists hold different ontological and epistemological visions (possibly triggered by institutional affiliation and personal background) that influence what are considered as relevant parameters that need to be captured to assess change. They also shape the agenda of what can or must be negotiated and implemented and in what way—even though external interest groups and institutions are not necessarily backed by democratic accounts of authorization or accountability. Finally, the data themselves will be interpreted and judged in relation to decision making and political interests. Hence, science-policy interfaces ultimately create meaning, structures, and practices also in natural resource management (Bracken & Oughton, 2013).

With view to REDD+, the transnational science-policy interface has engaged in the proliferation of *standards* to provide a specification of the safeguards. This more technical term captures principles, criteria, and indicators that facilitate the monitoring and evaluation of processes and products.[6] Hence, they can support assessing the implementation of the country approach to REDD+, including

through satellite-based remote sensing technology in tropical forest areas (Rajão, 2013), among other measures.[7]

So the science-policy interface exerts influence in conjunction with the SIS. For example, UN-REDD carried out a consultative process on the design of national SIS with a range of REDD+ stakeholders and technical advisors (Swan, 2016). Examples of already-existing standardized frameworks that have informed the debate in the past years include the Environment and Social Management Framework of the World Bank's FCPF; the Country Safeguards Approach Tool; Social and Environmental Principles and Criteria of UN-REDD; the REDD+ Social and Environmental Standards; the Strategic Environment and Social Assessment; or the Climate, Community & Biodiversity Standards. They differ with view to their specific tailoring toward the SIS and regarding the targeted unit of action. For example, REDD+ Social and Environmental Standards have been designed to be used by jurisdictional domestic actors at various levels, while the Climate, Community & Biodiversity Standards are designed for REDD+ projects on-site.

One reading of those developments suggests that the high degree of external policy recommendations along with (expected/promised) external funding supports but also reduces the room of manoeuvre of the state and domestic bureaucracies. In this sense, the formulation of standards at the trans- and international level can be regarded as practicing scientific authority and exerting influence that has the potential to translate into governing and political steering through external actors in domestic contexts. As the safeguards/standards discourse became dominant in the REDD+ negotiations and linked with the issue of finance, it foreclosed alternative discourses, knowledge claims, and governance practices, such as, for example, the rejection of REDD+ altogether. At the same time, though, procedural and substantial standards can serve as a point of reference for those actors who challenge harmful activities, incommensurate processes of exclusion and failure to act, for example, in the context of putting REDD+ into practice nationally. In this vein, it can be argued that the very expansion of the original REDD mandate—notably triggered by nonstate actors—to consider safeguards and noncarbon benefits at all was a broader claim to a successful contestation of the technocratic character of climate politics. Yet, subsequently, this language was again reformed into a more technical approach to make REDD+ governable. The SIS is a translation of the qualitative safeguards into measurable criteria that fit into the institutional logic of the UNFCCC. Furthermore, how this plays out in domestic application—particularly when the domestic institutional and actor setup is characterized by complexity as well—is another part of the story and essentially an empirical question. We thus now turn to the empirical illustration of the previous outlines, shedding light on land use governance and REDD+ in Costa Rica.

Land Use, REDD+, and the Prospects of a GE in Costa Rica

Forests cover over half of Costa Rica's land area (upward trend) and contribute to approximately 2% to national GDP (extended forest economy). However, it is assumed that the forestry sector should be reformed, "informing policy-makers about how forests contribute to the economy beyond what is reflected in GDP" (World Bank, 2016). This is where the broader claim to a GE, the potential trade-offs, or synergies and the linkages with land use approaches such as REDD+ come in.

But Costa Rica is rich not only in forests but also in biodiversity. According to the National Institute for Biodiversity, Costa Rica is one of the 20 most biodiverse countries in the world.[8] Almost 27% of the national territory is protected, with approximately 22% of the country's forests included in National Parks or Biological Reserves, and 19% in National Wildlife Refuges and Forestry Reserves.[9] Costa Rica is ranked among the nine countries with extremely high biodiversity in forest ecosystems (Kahle, 2009; Myers, Mittermeier, Mittermeier, daFonseca, & Kent, 2000) and is keen to display its green image (Evans, 1999) internationally: The country aims to be carbon neutral by 2021 and to be the first party of the CBD to achieve the convention's 2020 biodiversity targets.[10] Hence, the country presents itself as a front-runner by ambition with view to ecological safeguarding. And from the outset, this seems promising, given that Costa Rica scores drastically higher than most rainforest countries regarding general governance factors such as regulatory quality, rule of law, corruption perception, government effectiveness, and systematic and regular monitoring of forest cover (Barton, Faith, Rusch, Acevedo, & Castro, 2009). Still, over time, the sustainable land use management in Costa Rica has been experiencing a shift from the main priority of conservation of nature (i.e., biodiversity conservation) toward the promotion of carbon-friendly sustainable production practices, for which the development of a GE that is oriented toward income generation is coupled with carbon sequestration.

The Setup of Land Use Management, PES, and REDD+ in Costa Rica

Sustainable management of land use in Costa Rica follows two trajectories: sustainable production, for example, through NAMAs within the agriculture sector (NAMA coffee and NAMA livestock/cattle), and conservation. National Sustainable Forest Management standards for tropical forest and plantation forestry were introduced in the 1990s, when PES was also adopted as a compensation measure under the Forest Law. Even though PES is thus clearly anchored in the forestry sector—and not in the Biodiversity Law of 1998—it does consider the value of species diversity in forests. The national

PES scheme is financed mostly through taxes on fossil fuels and has been coined "the most successful" of its kind (GEF, 2005, p. 2), attributing Costa Rica with the reputation of being "a pioneer at the global level in the use of market mechanisms to reduce deforestation."[11] It compensates landholders for three conservation activities, natural forest conservation, reforestation, and agroforestry. This national approach has allowed Costa Rica to—contrary to all other Latin American countries—increase its forest cover over the years and to gain benefits from correlated economic sectors, such as ecotourism (Porras, Chacón-Cascante, & Miranda, 2013).[12] The World Bank praised the development of the forest sector in Costa Rica as it had supposedly "evolved from an inactive sector without private organizations, technology, or specialized education, to a proactive sector with multiple organizations that lobby effectively for forest sector measures" (World Bank, 2000, p. xvii). Yet, even though the PES system had been set up with the idea to incentivize land owners to cover a broad range of environmental services, such as carbon, water, biodiversity, and scenic beauty, one interviewee pointed out that, also due to the linkages with the financial resources coming from fuel-based taxes, "the mechanism [. . .] is basically carbon compensation. I would say it is not a willingness to pay model—it is a willingness to accept a charge model" (Interview November 23, 2016, Costa Rica).

In 2008, Costa Rica was selected for the FCPF and received a US$200,000 grant to prepare its REDD+ Readiness Preparation Proposal that was submitted 1 year later. After approval of the Readiness Preparation Proposal, a further grant of US$3.4 million was authorized, later increased to US$3.6 million with the addition of US$200,000 to develop a grievance redress mechanism.[13] Between 2010 and 2014, the national strategy was developed. Currently, Costa Rica is still in the readiness phase, including the preparation and consultation related to safeguards that kicked off with a national workshop on Strategic Environment and Social Assessment in 2011.

The country's high level of stateness (Bertelsmann Stiftung, 2016), technical capacity, and established PES architecture in combination with a distorted REDD+ preparation process in other parts of Central America apparently contributed to profiling Costa Rica again as a front-runner with the World Bank (Interview November 23, 2016, Costa Rica). And national policy developments in the land use area proceed. In 2015, the Ministry of Environment and Energy (MINAE) and the Ministry of Agriculture (MAG) designed a Policy for Agriculture and Environment (*Política Agroambiental*) that should focus on a broader landscape approach to integrate the two national NAMAS and REDD+. The policy contains visions and priorities including for the restoration of landscapes. It relates greenhouse gas sequestration and productivity by focusing on resource systems. Thus, major concerns are how to improve the productivity and value chains of agricultural products, for example, cocoa, coffee, meat, and dairy, and how to reduce emissions of carbon dioxide but also methane (Interview June 20, 2017, Costa Rica). Thereby, Costa Rica clearly

puts itself on a path toward an agroforest-based GE. However, a strategy for implementing the policy, including provisions for an optimization process of landscape organization, is pending.

The most important actor for the management of the PES and REDD+ is Fondo Nacional de Financiamento Forestal (FONAFIFO), an agency with independent legal status but with a mixed composition that encompasses representatives from the public sector, MINAE, MAG, the National Banking System, and two representatives from the private sector appointed by the National Forestry Office. The main responsibility of FONAFIFO in the PES program is to manage funds for the different ecosystem services. In REDD+, the agency is responsible for the development of the national strategy and hosts the REDD+ Secretariat. Among the many national actors involved in REDD+ and PES, various institutional overlaps have evolved, for example, between FONAFIFO, the Ministry of Finance, and MINAE. Other institutions have been introduced throughout the REDD+ process, such as the Indigenous Integrated Development Associations, The Biodiversity Institute, and Sistema Nacional de Areas de Conservacion (SINAC), which is part of MINAE and is responsible for administering Costa Rica's protected areas and for promoting and controlling conservation and sustainable natural resource management. Overall, we can thus observe a complex network of different types of actors, including state, nonstate, and international collectives.

In this light, it seems worthwhile to look at the implications of issue complexity around REDD+, relations between different types of actors (including the science–policy interface), rivalry of policy visions (e.g., mitigation or conservation through land use management), and provisions for effective implementation.

Complexity of Actor Constellation, Policy Visions, and Trade-Offs

As mentioned, FONAFIFO is the central formal coordinating agency of REDD+ but has also been referred to as the "forest administration" (Interview November 23, 2016, Costa Rica). Conceptual and policy ideas in forest and biodiversity governance additionally stem from entities such as the applied research university CATIE and FUNDECOR, a nongovernmental research organization that developed, inter alia, the first deforestation (prediction) model, basic elements of PES, and provided technical information for REDD+ readiness and GIS/satellite monitoring-based map of forest and nonforest areas in Costa Rica (Interview November 23, 2016, Costa Rica). These institutions are perceived as knowledge brokers, as expert authorities and translators between the technical and the political sphere (see also Le Coq, Frogner, Legrand, Pesche, & Seanz-Segura, 2010). Standardization of information is thus used to mainstream technical knowledge among a not-too-big political and scientific elite that works also strongly on personal ties. This potentially also facilitates the adaptation of safeguards to domestic forestry economics.

Relatedly, FONAFIFO has established a partnership with the National Geo-Environmental Information Center to create an online REDD+ safeguards module within the web presence of the National System for Environmental Information (SINIA) and building on SINIA's existing system of environmental indicators and statistics (Swan & Walcott, 2017). As reported by an interviewee, such technical components are considered incentives for land use change, while deliberative openness in the communities (pertaining also to the question which kinds of knowledge are valued in policy design and implementation) is considered relevant to increase accountability and transparency of policy measures.

In this sense, safeguards also function as a political instrument and as a vehicle for critique. Correspondingly, an in-depth study of the REDD+ readiness consultations in Costa Rica (Rosendal & Schei, 2014) found that indigenous groups and the conservation sector urged that the REDD+ strategy and policies should not focus exclusively on global carbon markets but rather include incentives for conservation in public protected areas. This is consistent with the position Costa Rica has maintained in the UNFCCC where it stressed the need for including and recognizing the carbon that is already stored by existing national parks and biodiversity reserves.

But incentives from external multilateral actors can also challenge domestic policy visions. Thus, it has been argued that the specifications of the World Bank and the pressure to mimic its administrative structure in the national safeguard system would

> undermine and undervalue the importance of the proper engagement with the academy, with the [national] organisations. What we have is a huge project with a lot of technical proposition, with a lot of investment, totally dislinked from the policy process of the country. (Interview November 23, 2016, Costa Rica)

Furthermore, it is reported that the funding situation in addition with the call to install structural adjustments rapidly creates some technocratic—yet substantially depleted—form of governing. Thus, FONAFIFO was in the situation to have to follow directions quickly; the room for autonomous bureaucratic action of domestic entities, particularly at the working level, is thus impacted through multlilateral politics. Our interviews suggest that this was particularly a crucial issue with view to social safeguards and the participation of indigenous peoples and local communities. On the other hand, the dynamics that developed through REDD+ at the international level supported political claims and participation of indigenous groups at the national level to an unprecedented extent (Interview June 26, 2017, Costa Rica). In other words, external actors practice their influence through the deployment of structural requirements in combination with exercising pressure of time—when governance and policy change should be realized in a few months despite century-long conflicts that needed to be resolved such as the participation of indigenous peoples (Interview November 23, 2016,

Costa Rica)—and through funding of REDD+, be it through bi- or multilateral public financing or a combination of government and market trading carbon credits (see also Kanowski, McDermott, & Cashore, 2011).

In a comparable perspective, however, the external pressure through the multilateral science-policy interface is most likely less of a challenge to Costa Rican biodiversity policies when compared with other receiving countries, for three reasons (Rosendal & Schei, 2014). First, biodiversity conservation policies are largely fully funded domestically in Costa Rica. Second, biodiversity policies still enjoy broad public support. Third, Costa Rica has a legal system that goes a long way to protect forests and their biodiversity. These three factors may, however, play out differently in poorer, forest-rich countries. Poorer countries would lack the necessary domestic resources to maintain the broader range of ecosystem services provided by biodiversity for human well-being. But as policy development proceeds, so does the challenge to deliver integrated high scores for a sustainable GE.

Hence, some opine that REDD+ possibly runs counter to national ideas for forest production. In response, it were, again, nonstate research and expert organizations that supported high-level ministerial actors in the design of the *Política Agroambiental*. This policy further blends domestic land use with the idea of a GE as outlined earlier and the call to revise the structure of the national forest sector. However, a joint approach toward landscape management or a reflection of diverging understandings toward the issue was not part of the design phase between the ministries that were involved (Interview June 20, 2017, Costa Rica). This omission might pose a challenge for the effective implementation of any future action, for example, in terms of technical monitoring of emissions from areas of abandoned pasture lands (intensive livestock production lands), as these areas could be used as secondary forests for the sustainable production of forest wood. Hence, the question arises whether mitigation action should be accounted for under REDD+ (the priority of MINAE) or NAMA livestock/cattle (priority of MAG) because double counting should be avoided. Here, the future construction of technical integrated standards could demarcate institutional boundaries, and thereby actually take on a highly political function. Relatedly, the establishment of cross-control and communication schemes seems relevant to ensure sustainable change. REDD+ funding could contribute to such institutional fine-tuning. However, as one interviewee put it, "the project is not about mobilizing money for institutions. It is about mobilizing money for carbon stocks" (Interview November 23, 2016, Costa Rica). It seems that—even in an institutionally relatively mature country such as Costa Rica—the pressure for recognized early action induces a political game around REDD+ that challenges the governance capacities, knowledge transfer mechanisms between science and policy as well as the political culture of recipient countries.

Such a fragmented setup could indeed benefit forest owners and producers looking for alliances with REDD+ investors for the voluntary carbon markets (Rosendal & Schei, 2014). Stakeholders interviewed pointed to the problem that it is difficult for small property holders to access money in the carbon markets: Costa Rica is a small country with small properties, which is one of the main reasons why the REDD+ carbon investors are mostly drawn toward the much more sizable indigenous territories. The trend is for business organizations and research centers to negotiate and grant carbon certificates with indigenous groups. In Colombia, many described these actors as "carbon cowboys," freelancers who broker deals with indigenous groups, make investments, and sell carbon credits to international markets (Aguilar-Støen, 2017). Also, in Costa Rica, environmental NGOs and indigenous groups are apprehensive that REDD+ and "carbon cowboy" deals could lead to increased use of plantations and less protection of forests (Rosendal & Schei, 2014).

And indeed, Costa Rica already experiences a process of fragmentation of landscape. To counter this tendency, a National Program of Biological Corridors (PNCB)[14] has been established in May 2006 in line with CBD's mandate to conduct National Conservation Gap Analyses to identify lands with high conservation value. By now, at least 36 areas have been identified as priority biological corridors (including at least one priority area from the gap analysis as well as a minimum of 50% forest), representing 1.7 million hectares, covering almost one third of the country.[15] The program was set up as part of a broader landscape strategy to increase the ecological but also the social connectivity between forest fragments. It thus functions as a "social platform" (Interview June 26, 2017, Costa Rica) to engage stakeholders, for example, private land owners, and local communities-based organizations and might be connecting protected areas. The PNCB is furthermore linked with REDD+ through the issue of prioritization in the following ways.

First, those areas in which biological corridors could be established need to be identified and prioritized. Second, FONAFIFO needed to develop evaluation criteria to prioritize the distribution of PES funding, as the national demand exceeds the available funding sources (Interview June 26, 2017, Costa Rica). Hence, as a complementary national strategy to the general PES approach, the PNCB was invoked as one tool to identify areas under official declaration of biological corridors. In that way, PES funding (and therewith also possibly REDD+ that will be offered under the broader scheme) would be prioritized for such areas whose primary goal was to conserve biodiversity.

However, there are severe limitations to the realization of the conservation potential—and thus to also realize the broader normative idea behind the international safeguards system—through PNCB. It is challenged by a lack of resources "as it operates outside the conservation area system, which absorbs

the bulk of the state budget allocation to SINAC, the national conservation area authority."[16] Furthermore, only a few corridors are organized through a strategic plan or a local committee. The observation that there is lack of intersectoral and institutionalized dialogue platforms, operative budgets, plans, and processes to involve local stakeholders, including private actors, indicate that the Costa Rican state agencies de facto do not proactively push this issue in an integrative manner. Yet, such proactive engagement may be required to put the system into practice nationally, or, in other words, to legitimately and effectively govern through standards.

Discussion and Outlook

In this article, we assessed the relation between biodiversity, forest-based policies, and the GE paradigm, refering to the development of REDD+ as a model case. We illustrated the conceptual and descriptive considerations, by drawing examples from a case study (followed up by additional interviews) of Costa Rica. In light of the still-scattered inclusion of biodiversity issues in the GE and climate change debate, we revised the nexus between the two areas—including with a specific focus on forests—from various angles. We found that there are good arguments for a more thorough recognition of co-benefits (i.e., ecological safeguards and rights-based approaches) for enhancing a sustainable GE. Thus, the development of corresponding ecological standards could serve as an instrument to mitigate possible negative side effects of a GE. At the same time, they could also shape governance in the forest areas in question, not least as they are often located in remote, possibly also indigenous territories. Therefore, social safeguards that score high on participatory quality, procedural rights, and substantial voice would also seem to be needed.

Responding to such concerns, the UNFCCC, strongly influenced by a multilateral and transnational science-policy interface, developed an SIS. Still, we have found that various challenges exist when it comes to operationalizing a sustainable, encompassing land use approach that includes REDD+ at the national level. These include complex (bureaucratic) actor constellations, the baseline problem, and insufficient MRV for biodiversity. We conclude from this that the quality of a GE, on one hand, hinges on the proliferation of governance standards to ensure that noneconomic aspects are thoroughly considered. On the other hand, the development and implementation of those formalized values are highly political endeavors.

As a previous study (Rosendal & Schei, 2014) had indicated the combined pressure from economic (external and domestic) development interests and emerging REDD+ principles and methodologies could make it harder for forest-rich, poor countries to maintain policies that protect a broad range of forest ecosystem services, including also those that are not tailored to carbon capture: REDD+ might actually reduce the scope of biodiversity conservation

because the carbon focus seems to be more likely to create economic incentives for reforestation and plantations than for biodiversity conservation and the natural regeneration of forests.

Thus, future research may wish to investigate how the scope and meaning of the REDD+ information system on safeguards will evolve in different national contexts—including through the proliferation of certificates such as the Climate, Community & Biodiversity Alliance Gold and Plan Vivo—and which spillover or interactive effects might emerge in relation with other international institutions. Relatedly, it seems worthwhile to analyze the linkages between the various standard systems that exist and whether diverging effects develop from their application. In this context, it will be interesting to trace how different forms of knowledge, for example, epistemic, technical, traditional, and anecdotal (Buchanan, 2013), are politically mobilized in the REDD+ discourse; how they are shaped into "actionable knowledge" (Weichselgartner & Kasperson, 2010); and how they relate to developmental, economic, and social narratives (including of a GE).

In addition, it will be illustrative to follow-up on how GE and REDD+ may affect the definition of domestic fiscal policies in the land use area and of land tenure policies. Finally, as we have found that Costa Rica has traditionally displayed a high profile in international land use politics, we assume that further insights might be derived from the development of new domestic approaches such as the currently pending *Política Agroambiental*.

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Notes

1. www.un-redd.org/AboutREDD/tabid/102614/Default.aspx
2. In this article, we do not address the normative side of biodiversity aspects within the GE debate, for example, the question of which absolute or relative ethical or moral stands should be taken against the nonhuman world.
3. www.teebweb.org
4. https://phys.org/news/2012-06-green-dark-side-economy.html
5. Preparation (capacity building, development of a national strategy or action plan, Phase 1); implementation (demonstration of activities and piloting of strategy,

Phase 2); full implementation including results-based payments and MRV (Phase 3). Phases 1 and 2 are also referred to as "REDD+ Readiness."
6. www.redd-standards.org
7. When it comes to biodiversity, there is still worldwide lack of good MRV mechanisms (Rosendal & Andresen, 2011; but see Mant, Salvaterra, Miles, & Kapos, 2014). Also, advisory formats are still lacking in the biodiversity realm (Reinecke, 2015; see Perrings, Duraiappah, Larigauderie, & Mooney, 2011 on the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services).
8. http://www2.inbio.ac.cr/en/biod/bio_biodiver.htm
9. https://theredddesk.org/countries/costa-rica
10. https://www.giz.de/en/worldwide/35382.html
11. https://theredddesk.org/countries/costa-rica
12. Indeed, the prospect of attracting tourism, particularly from the United States, has been one driver to develop sustainable resource management schemes (Interview November 23, 2016, Costa Rica).
13. https://theredddesk.org/countries/costa-rica
14. http://www.sinac.go.cr/EN-US/correbiolo/Pages/default.aspx
15. https://www.giz.de/en/worldwide/35382.html
16. https://www.giz.de/en/worldwide/35382.html

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