Molly Thomas

Analysing REDD

A Global Perspective

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ISBN: 978-1-9789-7477-7

Learning Press
5 Penn Plaza,
19th Floor,
New York, NY 10001, USA

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"Embodied Deforestation" as a New EU Policy Debate to Tackle Tropical Forest Loss: Assessing Implications for REDD+ Performance

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Received: 12 September 2018; Accepted: 27 November 2018; Published: 1 December 2018

Abstract: The need to tackle international drivers of deforestation has long been acknowledged; but remains little addressed via policy measures. In the European Union (EU), a new policy debate is emerging around the concept of "embodied deforestation", which targets EU agricultural commodity imports as drivers of deforestation. The notion views deforestation as an externality generated by EU imports associated with tropical deforestation. Our article examines whether this concept represents a shift in tackling international-level drivers of tropical deforestation within EU policy. We also examine, from a networked governance perspective, whether this new debate fuels further fragmentation or rather a move towards a more integrated approach to combating tropical forest loss within EU policy, and what the implications are for other initiatives, such as the climate change related "reducing emissions from deforestation and forest degradation" (REDD+). Our analysis draws on an extensive analysis of EU policy documents and semi-structured interviews with stakeholders and EU decision-makers. We find that, despite growing debate around the concept of embodied deforestation, policy measures necessary to reduce the impact of EU consumption of agricultural commodities associated with tropical deforestation have not yet been developed. We conclude that "embodied deforestation" remains more an idea than reality within EU policy to date, with the burden of responsibility for addressing international deforestation drivers still largely remaining on developing countries. There is still potential, however, for this debate to lead to a more integrated approach to tackling tropical deforestation within EU policy, if it comes to be seen, together with REDD+, as one of a number of linked approaches to EU efforts to combat deforestation.

Keywords: REDD+; European Union; forest policy; deforestation drivers; tropical forests

1. Introduction

The need to tackle drivers of deforestation and forest degradation operating at the international level has long been recognized [1], but has thus far largely been overlooked by national environmental policy-makers [2]. However, the issue is now beginning to be actively taken up in policy debates, including within the European Union (EU), as global trade in agricultural products becomes a more prominent driver of deforestation [3]. More than half of all deforestation and forest degradation worldwide is now estimated to be due to the conversion of forestland for commercial agriculture to meet global demand for food, fuel, and fibre [4]. Global demand for commodities is a major driver of deforestation in Latin America and Asia in particular, and a significant component of this global demand originates from within the EU [5]. How developed countries contribute to deforestation in tropical countries, particularly through importing agricultural commodities, is thus garnering increased attention, including within the EU.

A study produced for the European Commission in 2013 [6] (p.iv) estimated, for example, that the EU is responsible for 10% of global "embodied deforestation", i.e., deforestation as an externality in the production, trade or consumption of a good, commodity, or service. Recent declarations at the international level to reduce or end deforestation, such as the 2014 United Nations (UN) New York Declaration on Forests, and the Amsterdam Declaration by a number of European governments, as well as commitments by multinational companies to promote deforestation-free supply chains and certification schemes, such as the Roundtable on Sustainable Palm Oil (RSPO), are giving further impetus to policymakers seeking to tackle international consumption patterns that fuel tropical deforestation. Arguably, one of the first attempts by the EU to decrease the negative impacts of its consumption on tropical forests was through its 2009 Renewable Energy Directive, which required the introduction of sustainability criteria [7] to ensure biofuel production did not impact biodiverse primary forests [8]. The development of EU sustainability criteria was influenced by voluntary certification schemes, such as the RSPO [9], but both have been criticised for their limited ability to achieve sustainability in practice [10,11]. These efforts are now increasing, most recently, with adoption of a European Parliament resolution in 2017, which advocated restrictions on palm oil imports because of their negative environmental impacts, including adverse impacts on forests [12].

While the sustainability of commodity supply chains is increasingly the focus of both academic and policy scrutiny, our article analyses how these issues land within an increasingly fragmented global and EU-level forest governance architecture, with a wide array of initiatives spearheaded by both state and non-state actors to address tropical deforestation. Another highly visible such initiative is REDD+ (REDD+ stands for: Reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries) under the United Nations Framework Convention on Climate Change (UNFCCC), which financially compensates developing countries for reducing greenhouse gas emissions associated with deforestation and forest degradation [13]. REDD+ has been understood and implemented in a variety of ways by a range of state and non-state actors [14,15]. These include project-level initiatives, aiming to deliver co-benefits for biodiversity and communities in specific local contexts [16]; performance-based carbon payments [17,18]; and, more recently, sustainable landscape approaches that often involve the private sector [19,20].

REDD+ projects and sub-national initiatives have been shown to be responsive to some drivers operating at local and national levels, but are largely unable to tackle drivers of tropical forest loss operating at the international level [21,22], particularly those linked to agricultural production [23]. In addition to its focus on local as opposed to national or international drivers, REDD+ has also been criticised because of negative socio-economic impacts, such as fuelling inequality through restrictions on access to forests and the commodification of carbon [24,25]. In general, commentators see REDD+ as having failed to live up to the initial high expectations following its introduction in international climate change policy discussions in 2005, especially in terms of finance flowing to developing countries to combat tropical deforestation [15]. Notwithstanding such criticisms, recent research points to a reconceptualization of REDD+ in which it is viewed as a conservation and development measure, with more realistic expectations with regard to its performance, rather than being seen as "the" answer to tropical deforestation [26–28]. Furthermore, there is also expectation in both policy circles and academic literature that newer REDD+ landscape approaches, particularly those that involve the agri-business sector, will be better able to tackle drivers of deforestation linked to the expansion of large-scale agricultural commodities for export [29], even if their impact on drivers operating at the global level is limited [30]. The new interest in tackling international drivers linked to consumption in developed countries (i.e., the concept of embodied deforestation), combined with newly emerging REDD+ initiatives involving the private sector, may thus signal a new and more integrated approach to combating tropical forest loss, one that prioritizes tackling drivers of deforestation and forest degradation operating at the international level.

Yet whether this potential is being realized remains little analysed. The concept of embodied deforestation has not yet been discussed in the scholarly literature, given its very recent emergence within the EU policy arena. How the concept is understood, and the extent to which it is gaining traction from policy-makers, requires further examination. It is also unclear what role, if any, is foreseen for REDD+ by those engaged in this new discussion. Will a focus on embodied deforestation marginalise REDD+ or give it fresh relevance? How is REDD+ performance, particularly in relation to tackling international drivers, related to this new approach, if at all? And, finally, will tackling embodied deforestation become one of many initiatives aiming to address tropical deforestation within the EU, contributing to further fragmentation, or will it facilitate a more integrated approach?

This article analyses these timely questions. We proceed as follows: Section 2 reviews the concepts of fragmented and networked forest governance architectures, as the conceptual lens through which we analyse the nature and implications of the new notion of embodied deforestation. Section 3 outlines our methodology and methods of data generation and analysis. Section 4 maps the existing fragmented approach to forest policy-making in the EU, and how the embodied deforestation debate is emerging within this policy context. Section 5 presents our analysis of whether and how this new notion is being translated into EU policy. We conclude with considering whether it represents a move towards a more fragmented or integrated forest policy, and with what implications for REDD+.

2. From Fragmented to Networked Forest Governance: A Conceptual Shift

Forest governance arrangements, both globally and within the EU, have long been considered fragmented, insofar as multiple sites of governance authority co-exist. In recent years, there has been a shift from analysing causes and consequences of fragmentation to analysing the networked nature of forest governance [13,31]. Networked forest governance involves bringing together a wide range of actors representing different interests from the private and public spheres [32], with coordination and negotiation between independent stakeholders interacting horizontally (rather than vertically) [33]. In this context, forest governance by formal political administrative structures is replaced by diffuse and complex networks that involve a wide range of actors, [34], including from the private sector [35]. Although networked forest governance scenarios often describe a retreating of the state to make way for other actors, recent studies highlight that the state still imposes limits on the involvement of other actors [33] and often continues to exert considerable influence over the policy process [36].

As production and consumption of forest and agricultural products becomes increasingly globalised, with complex supply chains, it becomes increasingly difficult for states to regulate and govern the sustainability of production, leading to an emergence of hybrid forms of state and private governance [37]. Within globalised commodity chains, highly complex horizontal and vertical chains and networks emerge, with interactions between actors at different points of transactions. As such, networked governance can be " ... conceived as a mosaic of both formal and informal networks, interconnecting production practices in the space of place to the space of flows of global trade" [38]. In terms of action to tackle deforestation drivers linked to global commodity chains, the intervention points in such networked contexts are thus often located in developed countries (such as the EU), and therefore are outside the sphere of policy action that can be taken by governments in developing countries. The globalisation of commodity chains is increasingly impacting the effectiveness of REDD+ implementation, which is being adopted in a fragmented manner at sub-national or national levels [39]. This has meant, in some cases, a displacement of deforestation from early to late adopters of REDD+ [40].

It has been observed, however, that governance of some global value chains is also becoming more coordinated between concerned public and private actors at different scales [41]. Few studies, however, have analysed diverse EU forest policies from a networked forest governance perspective, with little analysis of the implications of emerging and new policy discourses for future EU action on, inter alia, REDD+. Some forest governance studies have been conducted in relation to the EU Forest Law Enforcement Governance and Trade (FLEGT) [42], but these have tended to focus on its impacts in

partner (i.e., developing) countries (for example, [43,44]). Studies have also been undertaken with regard to regional European forest policy, which indicate a long-recognised lack of policy integration within the EU itself [45], and an increasing trend of influence by economic state interests over environmental interests [46]. It is therefore timely to analyse whether the emerging EU "embodied deforestation" debate represents an actual shift in responsibility to address deforestation drivers from developing countries (via supply-side measures) to developed countries (via demand-side measures), whether it signals a shift from a fragmented to a more integrated approach, and what the implications for REDD+ are.

3. Methodology and Methods of Analysis

This analysis relies on qualitative methodologies of document analysis and interviews. Given that there is little published secondary literature on the concept of embodied deforestation, our sources of data have been almost exclusively primary documents, as well as semi-structured interviews with those involved in this very new, emerging debate. Our analysis is thus based on detailed primary document analysis of 55 recent policy documents (generated during the period of January 2014 to December 2017) developed by or for the EU, which we identified as being of relevance to EU tropical forest policy (for a complete list of analysed documents, see Appendix A). We selected these according to the following procedure: With regard to European Parliament documents, a search was conducted on the Parliament website for documents containing a reference to the word "forest". Any documents found were then included in the analysis, if they concerned global or tropical forests (as opposed to only being concerned with European forests). No equivalent search function exists on the European Commission website, so documents were instead searched for on the webpages of relevant Directorate-Generals covering policy areas considered to be relevant to the issue of international tropical forest policy, namely: climate change, energy, trade, sustainable development, agriculture, foreign policy, environment, development, and the general future direction of EU strategy and budget. Again, documents were only included in the analysis if they referred to forests globally or outside of the EU (with the exception being a few overarching documents that set out the general direction of future EU policies, which were included for their relevance to all EU policy areas).

Once the documents had been selected, the document analysis consisted of mining these documents to distil answers to a number of questions, through close reading of each. The questions related to, inter alia, what new policy measures were being proposed/advocated; what drivers of deforestation or forest degradation were sought to be addressed, if any; whether the emphasis was on tackling consumption in the EU, or on support for measures in developing countries; whether REDD+ was mentioned and if so, how; and whether new policies or funding for REDD+ implementation were being proposed, also in conjunction with efforts to tackle international drivers.

In addition to the document analysis, 15 semi-structured interviews were conducted with stakeholders and policy-makers involved in discussions on embodied deforestation in the EU, during the period of February–August 2018. These were intended to verify the findings of the document analysis. Stakeholders were mainly selected based on their participation in two conferences organised by the European Commission on tropical deforestation in 2014 and 2017 [47] and because they were known to be actively involved in EU tropical forest policy debates. A stakeholder mapping was undertaken to select a range of participants working in different organisations. There was, however, a lower response rate from those working in EU institutions and national governments than from those working for NGOs and research institutes. A list of interviewees is provided in Appendix B, and includes five policy-makers from EU institutions and national governments, five representatives of environmental NGOs, four independent experts and researchers, and one staff member from a UN agency. The questions posed included: Whether stakeholders saw the embodied deforestation concept as useful and why; whether they saw a change in the balance between EU support for demand-side measures (to be implemented by the EU) versus supply-side measures (to be undertaken by developing countries) to tackle tropical deforestation; what outcomes they hoped for; and what role they envisaged for REDD+ in evolving EU policies targeting deforestation.

4. Mapping the Fragmented Evolution of EU Tropical Forest Policy

Since there is no single international treaty dealing with tropical deforestation, the issue has been dealt with globally in a fragmented manner, through a range of diverse policy instruments and agreements on related topics, such as biodiversity or climate change [48]. EU policy instruments dealing with tropical forests have generally developed in response to participation in such international United Nations (UN) conventions and agreements. Thus, tropical forests have been dealt with across a range of EU policy instruments, mirroring the situation at the global-level where forests are addressed within international agreements on biodiversity, trade in endangered species, climate change, etc. EU forest policy is thus spread across various EU-level institutions, such as Directorates-General for climate change, development cooperation, environment, and trade. Each of these have their own perspectives on forest issues, with a similar situation prevailing at the level of individual EU Member States as well, where different dimensions of forest policy, whether climate, trade or biodiversity related, are usually addressed by different national-level ministries [49].

External EU policy-making on forests has been largely aligned with the goals of specific, existing UN Conventions and international agreements. Thus, policies on biodiversity have sought to find a balance between biodiversity conservation and its sustainable economic use [50], with a stated aim of achieving and supporting sustainable forest management in this context [49]. The EU Biodiversity Strategy [51] sets out actions to implement the UN Convention on Biological Diversity (CBD) and promote the conservation and sustainable use of biodiversity, including forests. Similarly, EU wildlife trade legislation [52] was adopted to implement rules under the Convention on the International Trade in Endangered Species (CITES) in order to protect species (including timber species) threatened by international trade. The EU also participates in the UN International Tropical Timber Organisation (ITTO), which was established from a commercial viewpoint to reconcile sustainable forest management with expansion of the tropical timber trade [53], and the UN Forum on Forests (UNFF), which emphasises the need to combat deforestation through expansion of sustainable forest management (SFM) [5]. Arguably, the EU policy instrument that has gained the most traction, political attention, and funding in relation to tropical forests is its Forest Law, Enforcement, Governance, and Trade (FLEGT) initiative developed in the context of the 2002 World Summit on Sustainable Development [54]. FLEGT aims to reduce imports of illegally logged timber into the EU, including by supporting action in developing countries to strengthen sustainable forest management and improve governance [55].

The EU and its Member States are also parties to the UN Framework Convention on Climate Change (UNFCCC) and have together contributed about 30% of global finance for REDD+. A large proportion of this has, however, been in the form of bilateral aid from Germany and the UK [56]. The EU established its REDD facility in 2010, but has also donated to existing multilateral initiatives, such as the World Bank Forest Carbon Partnership Facility (FCPF) and UN-REDD programme [57], rather than choosing to become a major player in its own right within global REDD+ discussions. The introduction of REDD+ in the UNFCCC discussions in 2005 represented a significant shift in the objectives of international forest policies, including at the EU level [58], with the focus on reducing carbon emissions from deforestation and forest degradation [59]. This new focus on carbon as the main service provided by forests contrasted to previous approaches [60] that aimed to find a balance between biodiversity conservation and logging for timber. The development of REDD+ was highly influenced by a growing narrative on "payments for ecosystem services" (PES) [61], which explored new funding sources for the conservation of ecosystems based on their utilitarian socio-economic values [62,63]. The PES approach was also promoted by EU policy-makers who, for example, funded ecosystem valuation studies such as the 2009 "The Economics of Ecosystems and Biodiversity" report [64]. Although widely endorsed within policy, the PES approach has also drawn criticism from those who highlighted concerns about the commodification of forests for their carbon values, and the potentially negative ecological [65,66] and social [67,68] impacts of this shift in focus.

Concerns have also been expressed that REDD+ unfairly burdens developing countries, with some suggesting it has been used as a distraction to cover up the lack of action by developed countries to

tackle their own greenhouse gas emissions [69]. In terms of external forest policy, EU policy processes have, like other international policymaking fora, historically focused more on supply-side rather than demand-side measures. They have done so by supporting actions taking place in partner (developing) countries, including through REDD+. The evolution of FLEGT, however, did signal a recognition that the EU needed both supply and demand-side measures to tackle illegal timber imports. Thus, the EU has been working to reduce the negative impacts of its tropical timber imports through engagement in the ITTO and CITES, and the adoption of its FLEGT Action Plan on combating illegal logging. It is now also beginning to develop policies to decrease the wider environmental impacts of consumption patterns, and its greenhouse gas emissions, and has adopted a Circular Economy Action Plan in 2015 to help transition to a sustainable, low carbon, resource efficient, and competitive economy [70].

Similarly, there has been an apparent shift in the implementation of development aid policies and programmes, with developed countries moving away from simply acting as donors to also committing to change their own policies. The adoption of the UN Sustainable Development Goals (SDGs) in 2015, for example, represented a significant change in focus from their predecessor, the Millennium Development Goals (MDGs), due to their universal applicability, with goals applying to both developed and developing countries. The European Commission is also considering whether to propose an EU Action Plan to Combat Tropical Deforestation, and in 2018, published a study [71] outlining the feasibility of policy options to tackle the drivers of tropical deforestation linked to EU imports of so-called "forest-risk" commodities, a new term gaining traction within this policy debate, which appears to refer to globally traded agricultural commodities that are associated with significant tropical deforestation. However, the European Commission has not yet decided which, if any, option to pursue. We turn next to whether this emerging discussion represents a real shift in EU policies dealing with tropical forests, by presenting the findings from our document analysis and interviews.

5. Tackling EU Embodied Deforestation: A New Approach to Addressing Drivers?

This section addresses whether and how the new debate on embodied deforestation is poised to address demand-side, international deforestation drivers, through specific adjustments to EU forest policy. It does so by analysing three aspects of this broad question: First, how the notion of embodied deforestation is conceptualized, and what new policy measures, if any, are advocated by policy-makers and stakeholders to tackle it; second, whether these debates and developments signal a real shift towards tackling deforestation drivers linked to EU consumption (i.e., demand side drivers); and third, whether these new debates and developments signal a move towards a less fragmented and more integrated approach to EU forest policy, and what role remains for REDD+ herein.

5.1. Conceptualising Embodied Deforestation: Emerging Policy Narratives

Our study of EU policy documents reveals a high level of EU support for implementing the SDGs (a central focus of 20 of the policy documents we analysed) and, to a lesser extent, climate action (a central focus of 10 documents), as illustrated in Table 1. EU policies across a range of subject areas are being shaped to reflect the aims of the SDGs. Those relating to climate, energy, and environment are all being tailored to tackle climate change, relating both to the EU's own emissions and to supporting actions in developing countries. In accordance with a realignment of its development policies to reflect the SDGs, the EU increasingly views its role less as a donor and more as a partner with developing countries. For example, the European Consensus document sets out the EU's development aid priorities, but also includes action on EU consumption patterns. The EU is also now encouraging other countries to address their own consumption patterns to become more sustainable, for example, through the EU-funded Switch Asia programme (Switch Asia is an EU funding programme to support sustainable production and consumption in Asia, http://www.switch-asia.eu/).

Table 1. Emphasis given to action on climate change, the SDGs and REDD+, in relevant EU policy documents.

	Climate and Energy	Trade	Sustainable Development	Agriculture	Foreign Policy	Environment	Development	Overall Policy Direction	Total
Total number of documents analyzed	12	2	4	2	2	19	7	7	55
Number of documents in which climate is a dominant focus	10	0	0	0	0	0	0	0	10
Number of documents in which SDGs are a dominant focus	2	1	4	0	0	6	6	1	20
Number of documents in which REDD is a dominant focus	1	0	0	0	0	1	0	0	2

Somewhat surprisingly, however, tackling global deforestation and REDD+ are low priorities within wider policy discussions on climate and the SDGs, and the relevance of forests and land use, in particular, to the climate debate is largely missed. Instead, EU climate action appears to focus more on tackling EU greenhouse gas emissions and how this can lead to innovation and new jobs within the EU, rather than on reducing negative environmental impacts elsewhere, caused by EU consumption. The Eurostat report on monitoring EU action to achieving the SDGs demonstrates the strong shift towards supporting action within the EU rather than in developing countries. Although the need to halt global deforestation is mentioned [72] (p. 299), the proposed indicators to monitor progress only cover forests in the EU. A key finding of our analysis is that REDD+, in particular, has a very low profile within analysed policy documents. It is the dominant theme of only two EU policy documents, both of which are reports on EU activities undertaken in the past. Of the 55 policy documents we analysed, only 16 mention REDD+ in passing. Even reports and documents that are very supportive of policy measures to conserve tropical forests, such as the European Parliament report calling for EU action for sustainability (which highlights the need to address deforestation drivers and expresses support for afforestation for mitigation), do not mention REDD+ specifically.

Whilst some support was expressed for "embodied deforestation" as a conceptual approach in our stakeholder interviews, it is unclear whether sufficient momentum is behind it to signal a change of approach in external EU forest policy. Around half of those interviewed consider the "embodied deforestation" concept to signal a useful approach, whilst identifying a number of limitations (Interviews with: EU policy-maker in Brussels, 1 February 2018; NGO representative by skype, 16 March 2018; EU agency representative by skype, 12 April 2018; independent expert by skype, 18 April 2018; researcher in Brussels, 26 April 2018; NGO representative by skype, 18 May 2018; EU policy-maker in Brussels, 24 May 2018; independent expert by skype, 17 August 2018). Interviewees noted, for example, that various terms are being used to express similar concepts, which is confusing. For example, the French government refers to "imported deforestation" [73], Sweden refers to reducing its ecological footprint (Interview with UN agency staff member by skype, 2 February 2018), and the recent European Commission feasibility study refers to "embedded deforestation" [71] (p. 31). Second, it was observed that the term has to be explained each time it is used, which limits its usage to policy-makers rather than being broadly understandable to a wider public. Others noted that all imports of a particular commodity are treated, within this simplified concept, as having the same deforestation impacts, which limits its accuracy. One interviewee commented that alternative concepts, such as "sustainable supply chains", are more likely to be understood and supported by a wider audience (Interview with EU policy-maker in Brussels, 1 February 2018). Despite the limitations of the approach, we next turn to considering whether the EU is moving towards a greater emphasis on demand-side measures to be adopted by developed countries, thereby sharing responsibility for tackling deforestation drivers more evenly than previous initiatives focusing on supply-side actions by developing countries.

5.2. Shifting Responsibility from South to North: Targeting Demand?

In terms of whether there has been a shift in the balance of responsibility for tackling deforestation drivers from developing to developing countries, with a corresponding shift in the balance between demand and supply-side measures in EU external forest policy, there appears to be a shift in rhetoric, at least. This is demonstrated, for example, by the European Parliament report on palm oil [12], which advocates restricting imports of palm oil to the EU to prevent deforestation. It should be noted, however, that this is just a policy recommendation by the European Parliament, with no proposals from the Commission to implement it, partly because this report was met with strong political opposition from Indonesia and Malaysia, who want to protect their export markets, as widely reported in the media, for example, [74] More generally, in our analysis of policy documents, we identified various supply-side and demand-side measures being advocated within EU policies relevant to forests (see Table 2 for the list of suggested new policy measures), with a higher number of actions relating to the

demand-side. As in the case of palm oil, however, very few of the suggested demand-side measures are mentioned in official policy documents. Instead, they are mainly mentioned in the draft of a feasibility study undertaken by consultants for the European Commission. If enacted, however, these suggested new policy measures would help to address a number of international drivers of deforestation and forest degradation. These include illegal logging and the international trade in timber (building on existing EU efforts under FLEGT and the EUTR), agricultural conversion linked to the global export of commodities and imports, as well as international financial transfers associated with deforestation.

Interviewees expressed strong support, for example, for the EU Timber Regulation (EUTR) as a model for tackling demand, despite well documented implementation challenges [49,75]. At least six interviewees noted that the EU needs to take a regulatory approach to tackling deforestation, along the lines of an EUTR for agricultural commodities (Interviews with: EU policy-maker in Brussels, 1 February 2018; NGO representative by skype, 23 February 2018; and NGO representative by skype, 16 March 2018; an EU agency member by skype, 12 April 2018; independent expert by skype 15 April 2018; independent expert by skype, 17 August 2018). Two of the interviewees also stated that the EU should develop a policy instrument that provides transparency in financial reporting by companies on deforestation risks (Interviews with an EU policy-maker in Brussels, 1 February 2018; an NGO representative by skype 12 April 2018). The only recent EU legislative proposal to actually tackle a driver of tropical deforestation or forest degradation is a proposal from the European Commission to decrease competition for land between biofuels, agriculture, and forests through changes to the Renewable Energy Directive. This was developed in response to considerable criticism of the EU's biofuels policy, see, for example [76]. As revealed in one of our interviews, however, the proposal was watered down considerably in early 2018 before being adopted (Interview with EU policy advisor in Brussels, 28 June 2018). Therefore, despite the rhetoric and the growing number of new suggested policy measures to tackle embodied deforestation, there is very little in the way of actual new legal or policy proposals to address EU consumption impacts. As summed up by one of our interviewees, in general, the European Commission is mostly interested in developing voluntary rather than regulatory measures to tackle demand and "expects more from partner countries than they are willing to do themselves" (Interview with an NGO representative by skype, 23 February 2018).

Our interviews with stakeholders involved in the EU policy debate also reveal differing views as to whether the EU should go beyond achieving legality to also mandating sustainability standards that imports should meet or aim for "zero deforestation" targets for commodity imports. This emerging discussion is building on experiences in relation to FLEGT, which currently only covers legality but could, in theory, be expanded to include sustainability criteria [42,44]. Four of the interviewees (Interviews with an EU policy-maker in Brussels, 1 February 2018; an NGO representative by skype, 16 March 2018; an NGO representative by skype, 12 April 2018; independent expert by skype, 17 August 2018) consider that a new policy tool to deal with deforestation should be based on sustainability rather than legality standards, although they recognised the challenges this posed in terms of gaining acceptance from partner developing countries. They also expressed concern that the EU would be imposing its sustainability standards and governing beyond its borders, although it should be noted that none of our interviewees recognised that in some cases, partner countries may have higher standards in place than the EU would like to impose for example [7]. Differing views were also expressed as to whether partner countries have adequate legal frameworks in place through which to implement a sustainability approach, or whether these would need to be updated or developed first.

Table 2. New suggested policy measures to combat tropical deforestation within documents published by or for EU policy-makers.

Suggested New Supply-Side Measures	Suggested New Demand-Side Measures	Suggested Measures Mentioning REDD+	Direct and Indirect Drivers of Deforestation and Forest Degraded that Would be Impacted
Climate change and energy -Measures to reduce impact of biofuels & indirect land-use change (ILUC) **Trade** -Support the conservation and sustainable use of natural resources -Support reductions in illegal logging **Sustainable development** -Financial support to partner countries **Environment** -Increased support to partner countries to protect forests, including for FLEGT -Incentives for Sustainable Forest Management (SFM) -Support synergies between REDD and FLEGT -Request for finance for global biodiversity -Support to reduce timber trafficking -Support to smallholder producers -Support to jurisdictions to prepare for REDD+ -Incentives for sustainably produced commodities **Development** -EU support for REDD+ in Key Landscape Areas	**Trade** -Increase supply chain transparency and due diligence **Sustainable development** -Measures to reduce consumption impacts on tropical forests-Improve sustainability of global supply chains **Agriculture** -Promote use of local rather than internationally-sourced timber **Environment** -Restrictions on oil palm imports -Support for commodity certification schemes -Support local rather than internationally-sourced biofuels -Certification schemes for commodity imports -Encourage China to adopt FLEGT-type measures -Demand-side measures to reduce illegal timber imports -Reduce consumption impacts on global biodiversity -Reduce impact of biofuel production on forests e.g., through sustainability criteria -Include sustainable forest trade in free trade agreements (FTAs) -Closure of EU markets to products linked to deforestation -Due diligence for forest risk commodities -Transparency initiatives and consumer information on agricultural commodities -Disclosure of financial information for forest risk commodities -Promotion of sustainable finance	**Environment** -Support synergies between REDD and FLEGT -Support to jurisdictions to prepare for REDD+ **Development** -EU support for REDD+ in Key Landscape Areas	**Climate change and energy** -Conversion for biofuels or ILUC **Trade** -Illegal logging -Conversion for global commodity imports **Sustainable development** -Conversion for global commodity imports -Lack of finance in partner countries **Agriculture** -Unsustainable timber logging **Environment** -Conversion for oil palm -Lack of finance in partner countries -Illegal logging and timber trafficking -Conversion for biofuels or ILUC -Unsustainable forest management -Conversion for smallholder agriculture -Lack of capacity at jurisdictional level -Lack of market incentives for sustainably produced commodities **Development** -Lack of finance for REDD+

5.3. From Fragmentation to Integration in Networked EU Forest Governance: What Role for REDD+?

Currently, EU external forest policy-making is highly fragmented, inconsistently applied, and contains gaps, or as one interviewee put it "efforts are all over the place so an overarching approach is needed" (Interview with EU policy-maker in Brussels, 1 February 2018). Another interviewee outlined the challenges as including contradictory policies proposed by different Commission Directorate-Generals; a lack of coherent planning as to how the EU will achieve its international forest policy commitments; and no standardised EU definition or understanding of key concepts, such as Sustainable Forest Management (SFM), REDD+, or even forests (Interview with NGO representative by skype, 18 May 2018). As pointed out by one interviewee, "the EU needs a deforestation policy and a REDD+ policy as it's not clear what it's trying to achieve in either sphere" and "the Member States all have divergent views" (Interview with an EU agency staff member by skype, 12 April 2018), thereby demonstrating a challenge of multilevel governance.

These views are reflected in a report from the EU REDD+ facility that outlines the REDD+ activities the EU is now supporting to address tropical deforestation, which includes several initiatives that are not generally thought of as being "REDD+", such as, for example, demand-side measures. This could either be interpreted as REDD+ evolving into a new conceptual approach or becoming increasingly irrelevant or side-lined in funding priorities. Those we interviewed gave differing views regarding the potential of REDD+ and its performance, also in terms of addressing deforestation drivers. One interviewee noted that "REDD+ has got so complex it's stuck and should go back to being an offsetting mechanism" (Interview with NGO representative by skype, 15 February 2018), whereas another was of the opposite view that "REDD+ is an umbrella which also encompasses sustainable supply chain approaches" (Interview with EU agency staff member by skype, 12 April 2018).

Looking ahead, as shown in Table 2, very little is actually suggested within documents published by or for EU policy-makers in relation to new REDD+ policies or funding. Divergent views were expressed in our interviews regarding the continuing role of the EU as a donor to REDD+. In theory, the EU target of 20% of budgetary spending for climate objectives (with a proposed increase to 25% in the European Commission's proposal for the new EU budget post-2020) [77] should make way for significant funding to be made available for REDD+. Large-scale European Commission funding has not been forthcoming in practice, however, although some individual EU countries, such as Germany and the UK, have provided substantial bilateral support for REDD+ [57]. Three interviewees (Interview with UN agency staff member by skype, 2 February 2018; NGO representative by skype, 15 February 2018; EU agency staff member by skype, 12 April 2018) were of the view that REDD+ finance from donors, such as the EU, has been helpful in creating enabling conditions to combat deforestation, even as the readiness process has created expectations within partner (developing) countries of continued finance (as also mentioned by Hein et al [78]). This would need to be followed through, for example, by funding REDD+ landscape/jurisdictional approaches, yet our analysis suggests that such increasing funding is not necessarily envisioned.

Skepticism was also expressed regarding the proper establishment of a functioning carbon market and the lack of interest in this by the private sector, who seem to be more attracted to the idea of sustainable supply chains (Interviews with UN staff member by skype, 2 February 2018; NGO representative by skype, 15 February 2018; NGO representative by skype, on 16 March 2018; and EU agency staff member by skype, 12 April 2018), although it was also noted that international aviation carbon offsets schemes could provide a new way forward, as also commented by Golub [79]. A Commission-funded study published in March 2018 outlines potential EU policy options for tackling tropical deforestation and includes a recommendation for the EU to support "jurisdictional REDD+ projects to promote sustainable and deforestation-free agriculture production" [80] (p. 75), which, if implemented, could provide a new way forward for EU support for REDD+ initiatives that combines jurisdictional REDD+ with supply chain approaches. Furthermore, EU development aid policies are increasingly looking to partner with the private sector to deliver policy goals through public-private-partnerships (PPPs), which may open new opportunities and lead to novel networked

forest governance arrangements in partner developing countries [81], but also risks watering down forest conservation objectives.

Several interviewees mentioned the need for the EU to contribute to global dialogues on REDD+ or other multilateral processes that can link demand and supply-side measures, and suggested that the SDGs could provide a helpful framework for this process (potential synergies between REDD+ and the SDGs have also been noted by others, such as [82]). However, it was noted that there is no obvious existing UN fora where such a dialogue could take place, with little confidence expressed in the UNFF (in line with previous criticism, for example, [83]). It was therefore suggested that in practice it may be more workable for the EU to encourage further dialogue on this issue (Interviews with UN staff member by skype, 2 February 2018, NGO representative by skype, 15 February 2018, NGO representative by skype, 23 February 2018 and EU agency staff member by skype, 12 April 2018). One interviewee noted that the UNFCCC is now turning its attention to decreasing greenhouse gas emissions linked to agriculture. This could be an area in which the EU could envisage playing a leading role, both by tackling emissions linked to its own domestic agriculture as well as through promoting sustainable supply chains and responsible consumption, partially through existing REDD+ approaches. Others note, however, that there is limited potential to build synergies between LULUCF accounting and REDD+ (see, for example, [84]) and from the perspective of one interviewee, the EU's own rules on LULUCF accounting lack credibility and environmental integrity (Interview with an EU agency staff member by skype, 12 April 2018).

Our analysis reveals, furthermore, several calls from different stakeholders for an EU Action Plan to Combat Tropical Deforestation (mentioned in five documents from the European Parliament and one from a research agency), and in two interviews (Interview with NGO representative by skype, 16 March 2018 and independent expert by skype, 18 April 2018). An Action Plan could provide a new comprehensive approach to external EU forest policy, with an overarching policy framework that includes both demand-side and supply-side measures. It could also place current support for REDD+ within a more integrated approach, as one of a number of measures to tackle deforestation rather than as the sole solution to tackling tropical deforestation. EU action plans can be effective tools for increasing political and financial support to tackle an issue. The publication of the EU FLEGT Action Plan in 2003, for example, garnered significant support for preventing the imports of illegal logged timber into the EU [85], thereby tackling one important driver of forest degradation. The publication of an EU Action Plan against Wildlife Trafficking in 2016 similarly gave considerable impetus to addressing wildlife trafficking. Action plans can, however, also remain weak, non-binding documents if they do not include legislative proposals. Thus, they may fail to achieve inter-sectoral integration, as was reportedly the case for the EU's domestic forest strategy and associated action plan [45,86]. So far, the European Commission is yet to come forward with a proposal for an action plan in relation to tropical deforestation.

6. Conclusions

Our analysis has shown that there is growing momentum within the EU to implement the SDGs and act on climate change, but tackling tropical deforestation or supporting REDD+ remain relatively low priorities for policy-makers within these wider debates. There has been a genuine shift in emphasis within policy debates towards addressing greenhouse gas emissions and negative impacts of consumption at the EU level. However, a gap remains between such rhetoric and specific policy measures being proposed to tackle EU consumption in relation to tropical deforestation. Despite several calls for an EU Action Plan against Tropical Deforestation that contains regulatory measures on EU imports of forest-risk commodities, and suggested new policy measures included in several documents, the European Commission has not yet acted. This may be because economic interests are now dominating strongly over environmental ones, as has happened in the case of domestic EU forest policies [87], although there are indications that some private companies are actually supportive of greater EU action on tropical forests [71].

With regard to REDD+, very little is being proposed in terms of new policies or funding. This could be because of the perception that the private sector is more interested in "sustainable supply chain" approaches, despite limited evidence that they can deliver on social sustainability objectives and reduce deforestation [78,88]. It is currently unclear whether supply-chain approaches will give further impetus to jurisdictional REDD+, whether they will replace or be a substitute for REDD+ initiatives, or whether new networked governance arrangements will emerge with partner (developing) countries. If the European Commission does decide to develop an overarching action plan that includes both demand- and supply-side measures, this could indeed signal a new integrated EU approach to tackling deforestation, which replaces the current range of fragmented approaches. Under this scenario, REDD+ could become one of a number of linked policy approaches, rather than being burdened with the expectation that it can solve tropical deforestation (and all associated issues) on its own. This would also spread the burden of responsibility more evenly between developed and developing countries. Embedding REDD+ within the framework of an initiative, such as an EU Action Plan, could also contribute to overcoming two major challenges, namely the lack of REDD+ finance and the need to address international drivers of deforestation and forest degradation [89]. However, in the absence of actual EU legislative proposals to tackle drivers linked to global consumption and new commitments to REDD+ finance, the interest in tackling embodied deforestation is unlikely to signify major policy change, with the burden of responsibility to combat deforestation continuing to fall on developing countries.

Author Contributions: Conceptualization, J.W.-S. and A.G.; Data curation, J.W.-S.; Formal analysis, J.W.-S.; Investigation, J.W.-S.; Methodology, J.W.-S.; Supervision, A.G.; Writing—original draft, J.W.-S.; Writing—review & editing, A.G.

Funding: This research received no external funding. Wageningen University will cover the cost of publication (open access fee).

Conflicts of Interest: The authors declare no conflict of interest. The lead author is employed by the Wildlife Conservation Society (WCS) which works to advise on and advocate for EU policy action in favour of wildlife conservation. This research was undertaken independently in a personal capacity as part of a PhD programme at Wageningen University and was not funded by WCS.

Appendix A. List of EU Policy Documents Included in the Analysis

	Policy Area and Document Title	Date	Institution	Document Type
	Climate Change & Energy			
1	On the proposal for a regulation on the inclusions of GHG emissions and LULUCF	3 May 2017	EP DEV Committee	Opinion
2	On the proposal for a regulation on the inclusions of GHG emissions and LULUCF	4 May 2017	EP AGRI Committee	Opinion
3	A policy framework for climate and energy in the period from 2020 to 2030	22 January 2014	EC	Communication
4	A policy framework for climate and energy in the period from 2020 to 2030—impact assessment	22 January 2014	EC	Staff working paper
5	on Towards a new international agreement in Paris	30 September 2015	EP ENV Committee (plenary)	report
6	on Towards a new international agreement in Paris	30 September 2015	EP Industry & research committee	opinion
7	on Towards a new international agreement in Paris	30 September 2015	EP DEV Committee	opinion
8	The Paris Protocol—A blueprint for tackling global climate change beyond 2020—staff working document	25 February 2015	EC	Staff working paper accompanying a communication
9	European Union. (2015). Forests, Climate and People: EU support to combat tropical deforestation (REDD+) 2006–2014.	2015	EC DG Clima	Brochure
10	Directive amending Directives on petrol and diesel fuels and renewable energy	15 September 2015	EC	Directive
11	Proposal for a Directive on the promotion of renewable energy use	23 February 2017	EC	Proposed directive
12	DG Clima Strategic Plan 2016–2020	26 April 2016	EC DG Clima	Strategic plan
	Trade			
13	On the impact of international trade and the EU's trade policies on global value chains	10 May 2017	EP Trade Committee	Draft report
14	Trade for all: towards a more responsible trade and investment policy	2014	EC	Strategy
	Sustainable development			
15	On EU action for sustainability	27 June 2017	EP ENV Committee (plenary)	Report
16	On EU action for sustainability	27 June 2017	EP DEV report	Report
17	Next steps for a sustainable European future: European action for sustainability	22 November 2016	EC	Communication
18	Key European action supporting the 2030 agenda and SDGs	22 November 2016	EC	Staff working paper
	Agriculture			
19	On a new EU forest strategy: for forests and the forest-based sector	25 February 2015	EP ENV Committee	Opinion
20	On a new EU forest strategy: for forests and the forest-based sector	1 April 2015	EP AGRI Committee (plenary)	Report
	Foreign policy			
21	On EU political relations with Latin America	31 May 2017	EP DEV Committee	Opinion
22	A strategic approach to resilience in the EU's external action	7 June 2017	EC	Communication
	Environment			
23	On palm oil and deforestation of rainforests	17 March 2017	EP ENV Committee (plenary)	Report
24	On palm oil and deforestation of rainforests	2 March 2017	EP DEV Committee	Report
25	On palm oil and deforestation of rainforests	24 January 2017	EP INTA Committee	Opinion
26	On palm oil and deforestation of rainforests	2 March 2017	EP AGRI Committee	Opinion

	Policy Area and Document Title	Date	Institution	Document Type
27	Transparency and accountable management of natural resources in developing countries: the case of forests	May 2017	DG for external policies for the EP Dev Committee	Study
28	Analysis and evidence in support of the EU Action Plan against Wildlife Trafficking	26 February 2016	EC	Staff working paper
29	EU Action Plan against Wildlife Trafficking COM (2016) 87	26 February 2016	EC	Communication
30	Evaluation of the EU FLEGT Action Plan	27 April 2016		Independent consultancy report
31	Evaluation of the EU FLEGT Action Plan	2 August 2016	EC	Staff working paper
32	EU REDD Facility: Highlights and insights from 2016	3 March 2017	EU REDD Facility	Report
33	On the mid-term review of the EU's biodiversity strategy	8 December 2015	EP DEV Committee	Opinion
34	On the mid-term review of the EU's biodiversity strategy	7 January 2016	EP ENV Committee (plenary)	Report
35	The mid-term review of the biodiversity strategy to 2020	2 October 2015	EC	Report
36	EU assessment of progress in implementing the EU biodiversity strategy to 2020	2 October 2015	EC	Staff working paper
37	DG Environment strategic plan 2016–2020	23 March 2016	EC	Strategic plan
38	Environmental indicator report 2017	13 November 2017	EEA	Monitoring report
39	Mid-term review of the 7th EAP	November 2017	EPRS	Research report
40	Draft feasibility study on options to step up EU action against deforestation part I	June 2017	COWI (for DG ENV)	Independent consultancy report
41	Draft feasibility study on options to step up EU action against deforestation part II	June 2017	COWI (for DG ENV)	Independent consultancy report
	Development aid			
42	The new European Consensus on Development "Our world, our dignity, our future"	7 June 2017	EC, EP, Council	Joint statement
43	Collect more—spend better—achieving development in an inclusive and sustainable way	October 2015	EC	Staff working paper
44	DG Development strategic plan 2016–2020	1 May 2016	EC	Strategic plan
45	Monitoring report on progress towards the SDGs in an EU context	20 November 2017	Eurostat	Monitoring report
46	Larger than elephants—synthesis	2015		Consultant's report
47	A global partnership for poverty alleviation and sustainable development	5 February 2015	EC	Communication
48	A global partnership for poverty alleviation and sustainable development—annex	5 February 2015	EC	annex to a communication
	General EU strategy/budget			
49	White Paper on the Future of Europe	1 March 2017	EC	White paper
50	Reflection paper on the social dimension of Europe	17 April 2017	EC	White paper
51	Reflection paper on harnessing globalization	10 May 2017	EC	White paper
52	Reflection paper on the future of EU finances	28 June 2017	EC	White paper
53	Future Financing of the EU: Final report and recommendations of the High Level Group on Own Resources	December 2016	High level group	Report
54	EP report on the post electoral revision of the MFF 2014–2020	30 June 2016	EP	Report
55	Strengthening European Investments for jobs and growth: Towards a second phase of the European Fund for Strategic Investments and a new European External Investment Plan	14 September 2016	EC	Communication

Appendix B. List of Interviewees

Job Function	Institution Type	Date of Interview	Location
Policy-maker	European Commission	1 February 2018	Brussels, Belgium
Forest Expert	UN agency	2 February 2018	Skype
Policy Manager (former)	Environmental NGO	15 February 2018	Skype
Lawyer	Environmental NGO	23 February 2018	Skype
Campaigner	Environmental NGO	16 March 2018	Skype
Campaigner	Environmental NGO	12 April 2018	Skype
Forest Expert	EU agency	12 April 2018	Skype
Forest Expert	Freelance consultant	18 April 2018	Skype
PhD Student	University	26 April 2018	Brussels, Belgium
Senior Policy Officer	Environmental NGO	18 May 2018	Skype
Negotiator	National government	24 May 2018	Skype
Policy-maker	European Commission	24 May 2018	Brussels, Belgium
Senior Researcher	Research institute	24 May 2018	Skype
Policy Advisor	European Parliament	28 June 2018	Brussels, Belgium
Forest Policy Expert	Independent consultant	17 August 2018	Skype

References

1. Lambin, E.F.; Turner, B.L.; Geist, H.J.; Agbola, S.B.; Angelsen, A.; Bruce, J.W.; Coomes, O.T.; Dirzo, R.; Fischer, G.; Folke, C.; et al. The causes of land-use and land-cover change: Moving beyond the myths. *Glob. Environ. Chang.* **2001**, *11*, 261–269. [CrossRef]
2. Henders, S.; Ostwald, M.; Verendel, V.; Ibisch, P. Do national strategies under the UN biodiversity and climate conventions address agricultural commodity consumption as deforestation driver? *Land Use Policy* **2018**, *70*, 580–590. [CrossRef]
3. Meyfroidt, P.; Lambin, E.F.; Erb, K.H.; Thomas, W.H. Globalization of land use: Distant drivers of land change and geographic displacement of land use. *Curr. Opin. Environ. Sustain.* **2013**, *5*, 438–444. [CrossRef]
4. Lawson, S.; Blundell, B.A.; Cabarle, N.; Basik, M.J.; Canby, K. Consumer Goods and Deforestation: An Analysis of the Extent and Nature of Illegality in Forest Conversion for Agriculture and Timber Plantations. Available online: http://www.forest-trends.org/embargoed/logging_2014/infographic.pdf (accessed on 12 September 2018).
5. Rautner, M.; Leggett, M.; Davis, F. *The Little Book of Big Deforestation Drivers*; Global Canopy Programme: Oxford, UK, 2013.
6. European Commission. The Impact of EU Consumption on Deforestation: Comprehensive Analysis of the Impact of EU Consumption on Deforestation. Available online: http://ec.europa.eu/environment/forests/pdf/1.%20Report%20analysis%20of%20impact.pdf (accessed on 12 September 2018).
7. Bicalho, T.; Bessou, C.; Sergio, A.P. Land use change within EU sustainability criteria for biofuels: The case of oil palm expansion in the Brazilian amazon. *Renew. Energy* **2016**, *89*, 588–597. [CrossRef]
8. European Commission. Directive 2009/28/EC of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC. Available online: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:en:PDF (accessed on 30 November 2018).
9. Harnesk, D.; Brogaard, S.; Peck, P. Regulating a global value chain with the European Union's sustainability criteria—Experiences from the Swedish liquid transport biofuel sector. *J. Clean. Prod.* **2017**, *153*, 580–591. [CrossRef]
10. De Man, R.; German, L. Certifying the sustainability of biofuels: Promise and reality. *Energy Policy* **2017**, *109*, 871–883. [CrossRef]
11. Oliveira, G.L.T.; McKay, B.; Plank, C. How biofuel policies backfire: Misguided goals, inefficient mechanisms, and political-ecological blind spots. *Energy Policy* **2017**, *108*, 765–775. [CrossRef]
12. European Parliament. Report on Palm Oil and Deforestation of Rainforests. 2017. Available online: http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A8-2017-0066+0+DOC+PDF+V0//EN (accessed on 12 September 2018).
13. Reinecke, S.; Pistorius, T.; Pregernig, M. UNFCCC and the REDD+ partnership from a networked governance perspective. *Environ. Sci. Policy* **2014**, *35*, 30–39. [CrossRef]
14. Gupta, A.; Pistorius, T.; Marjanneke, J.V. Managing fragmentation in global environmental governance: The REDD+ partnership as bridge organization. *Int. Environ. Agreem. Polit. Law Econ.* **2016**, *16*, 355–374. [CrossRef]
15. Turnhout, E.; Gupta, A.; Weatherley-Singh, J.; Vijge, M.J.; de Koning, J.; Visseren-Hamakers, I.J.; Herold, M.; Lederer, M. Envisioning REDD+ in a post-Paris era: Between evolving expectations and current practice. *Wiley Interdiscip. Rev. Clim. Chang.* **2016**, *8*, 1–13. [CrossRef]
16. Blom, B.; Sunderland, T.; Murdiyarso, D. Getting REDD to work locally: Lessons learned from integrated conservation and development projects. *Environ. Sci. Policy* **2010**, *13*, 164–172. [CrossRef]
17. Corbera, E. Problematizing REDD+ as an experiment in payments for ecosystem services. *Curr. Opin. Environ. Sustain.* **2012**, *4*, 612–619. [CrossRef]
18. Limberg, G.A.; Moeliono, M.; Indriatmoko, Y.; Iwan, R.; Utomo, N.A.; Purwanto, E.; Mulyana, A. Incentives to conserve or convert? Can conservation compete with coal in Kutai national park, Indonesia? *Int. J. Biodiv. Sci. Manag.* **2009**, *5*, 190–198. [CrossRef]
19. Boucher, D.; Elias, P. From REDD to deforestation-free supply chains: The persistent problem of leakage and scale. *Carbon Manag.* **2013**, *4*, 473–475. [CrossRef]

20. Fishbein, G.; Lee, D. Early Lessons from Jurisdictional REDD+ and Low Emissions Development Programs, Rep. Arlington, United States. 2015. Available online: https://www.forestcarbonpartnership.org/sites/fcp/files/2015/January/REDD%2B_LED_web_high_res.pdf (accessed on 12 September 2018).
21. Kissinger, G.; Herold, M.; De Sy, V. Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers, Lexeme Consulting, Vancouver, Canada. 2012. Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/65505/6316-drivers-deforestation-report.pdf (accessed on 12 September 2018).
22. Weatherley-Singh, J.; Gupta, A. Drivers of deforestation and REDD+ benefit-sharing: A meta-analysis of the (missing) link. *Environ. Sci. Policy* **2015**, *54*, 97–105. [CrossRef]
23. Soto Golcher, C.; Arts, B.; Visseren-Hamakers, I. Seeing the forest, missing the field: Forests and agriculture in global climate change policy. *Land Use Policy* **2018**, *77*, 627–640. [CrossRef]
24. Hunsberger, C.; Corbera, E.; Borras, S.M.; Franco, J.C.; Woods, K.; Work, C.; de la Rosa, R.; Eang, V.; Herre, R.; Kham, S.S.; et al. Climate change mitigation, land grabbing and conflict: Towards a landscape-based and collaborative action research agenda. *Can. J. Dev. Stud.* **2017**, *38*, 305–324. [CrossRef]
25. Dawson, N.; Mason, M.M.; Mwayafu, D.M.; Dhungana, H.; Satyal, P.; Janet, A.F.; Zeitoun, M.; Schroeder, H. Barriers to equity in REDD+: Deficiencies in national interpretation processes constrain adaptation to context. *Environ. Sci. Policy* **2018**, *88*, 1–9. [CrossRef]
26. Lund, J.F.; Sungusia, E.; Mabele, M.B.; Scheba, A. Promising change, delivering continuity: REDD+ as conservation fad. *World Dev.* **2017**, *89*, 124–139. [CrossRef]
27. Duchelle, A.; Simonet, E.G.; Sunderlin, W.D. Wunder, S. What is REDD+ achieving on the ground? *Curr. Opin. Environ. Sustain.* **2018**, *32*, 134–140. [CrossRef]
28. Massarella, K.; Susannah, M.S.; Jonathan, E.E.; Marchant, R. REDD+, hype, hope and disappointment: The dynamics of expectations in conservation and development pilot projects. *World Dev.* **2018**, *109*, 375–385. [CrossRef]
29. Nepstad, D.; Irawan, S.; Bezerra, T.; Boyd, W.; Stickler, C.; Shimada, J.; Carvalho, O.; MacIntyre, K.; Dohong, A.; Alencar, A.; et al. More food, more forests, fewer emissions, better livelihoods: Linking REDD+, sustainable supply chains and domestic policy in Brazil, Indonesia and Colombia. *Carbon Manag.* **2013**, *4*, 639–658. [CrossRef]
30. Weatherley-Singh, J.; Gupta, A. An ecological landscape approach to REDD+ in Madagascar: Promise and limitations? *For. Policy Econ.* **2017**, *85*, 1–9. [CrossRef]
31. Gallemore, C. Transaction costs in the evolution of transnational polycentric governance. *Int. Environ. Agreem. Polit. Law Econ.* **2017**, *17*, 639–654. [CrossRef]
32. Jedd, T. Accountability and legitimacy in transboundary networked forest governance: A case study of the roundtable on the crown of the continent. Ph.D. Thesis, Colorado State University, Fort Collins, CO, USA, 2015.
33. Schulz, T.; Lieberherr, E.; Zabel, A. Network governance in national Swiss forest policy: Balancing effectiveness and legitimacy. *For. Policy Econ.* **2016**, *89*, 42–53. [CrossRef]
34. Jedd, T.; Bixler, R.P. Accountability in networked governance: Learning from a case of landscape-scale forest conservation. *Environ. Policy Gov.* **2015**, *25*, 172–187. [CrossRef]
35. Pistorius, T.; Freiberg, H. From target to implementation: Perspectives for the international governance of forest landscape restoration. *Forests* **2014**, *5*, 482–497. [CrossRef]
36. Arts, B. Assessing forest governance from a 'Triple G' perspective: Government, governance, governmentality. *For. Policy Econ.* **2014**, *49*, 17–22. [CrossRef]
37. Bush, S.R.; Oosterveer, P.; Bailey, M.; Mol, A.P.J. Sustainability governance of chains and networks: A review and future outlook. *J. Clean. Prod.* **2015**, *107*, 8–19. [CrossRef]
38. Bush, S.R.; Oosterveer, P. The missing link: Intersecting governance and trade in the space of place and the space of flows. *Sociol. Rural.* **2007**, *47*, 384–399. [CrossRef]
39. Well, M.; Carrapatoso, A. REDD+ finance: Policy making in the context of fragmented institutions. *Clim. Policy* **2017**, *17*, 687–707. [CrossRef]
40. Ingalls, M.; Meyfroidt, P.; To, P.X.; Kenney-Lazar, M. The transboundary displacement of forest change under REDD+: Problematic intersections between land-grabbing and trade flows in the Mekong region. *Glob. Environ. Chang.* **2018**, *50*, 255–267. [CrossRef]

41. Milligan, B.; O'Keeffe, M. Global governance of resources and implications for resource efficiency in Europe. *Ecol. Econ.* **2018**, *155*, 46–58. [CrossRef]
42. Van Heeswijk, L.; Turnhout, E. The discursive structure of FLEGT (forest law enforcement, governance and trade): The negotiation and interpretation of legality in the EU and Indonesia. *For. Policy Econ.* **2013**, *32*, 6–13. [CrossRef]
43. Springate-Baginski, O.; Thein, A.K.; Neil, A.; Thu, W.M.; Doherty, F. Democratising timber: An assessment of Myanmar's emerging 'forest law enforcement, governance and trade' (FLEGT) process. *For. Policy Econ.* **2014**, *48*, 33–45. [CrossRef]
44. Lesniewska, F.; McDermott, C.L. FLEGT VPAs: Laying a pathway to sustainability via legality lessons from Ghana and Indonesia. *For. Policy Econ.* **2014**, *48*, 16–23. [CrossRef]
45. Winkel, G.; Sotirov, M. Whose integration is this? European forest policy between the gospel of coordination, institutional competition, and a new spirit of integration. *Environ. Plan. C Gov. Policy* **2016**, *34*, 496–514. [CrossRef]
46. Giessen, L.; Krott, M.; Möllmann, T. Increasing representation of states by utilitarian as compared to environmental bureaucracies in international forest and forest-environmental policy negotiations. *For. Policy Econ.* **2014**, *38*, 97–104. [CrossRef]
47. DG Environment. 2017. Available online: http://ec.europa.eu/environment/forests/deforestation.htm (accessed on 12 September 2018).
48. Pistorius, T. From RED to REDD+: The evolution of a forest-based mitigation approach for developing countries. *Curr. Opin. Environ. Sustain.* **2012**, *4*, 638–645. [CrossRef]
49. Pirlot, P.; Delreux, T.; Farcy, C. Forests: A multi-sectoral and multi-level approach to sustainable forest management. In *European Union External Environmental Policy*; Adelle, C., Biedenkopf, K., Torney, D., Eds.; Palgrave Macmillan: Cham, Switzerland, 2018.
50. Morgera, E. Ambition, complexity and legitimacy of pursuing mutual supportiveness through the EU's external environmental action. In *The Legal Dimension of Global Governance: What Role for the EU?* Vooren Van, B., Blockmans, S., Wouters, J., Eds.; Oxford University Press: Oxford, UK, 2012.
51. European Commission. Our Life Insurance, Our Natural Capital: An EU Biodiversity Strategy to 2020. Available online: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52011DC0244 (accessed on 12 September 2018).
52. European Commission. Council Regulation on the Protection of Species of Wild Fauna and Flora by Regulating Trade Therein. Available online: https://eur-lex.europa.eu/legal-content/GA/TXT/?uri=celex:31997R0338 (accessed on 30 November 2018).
53. United Nations. International Tropical Timber Agreement. Available online: https://treaties.un.org/doc/Treaties/2006/02/20060215%2004-26%20PM/Ch_XIX_46p.pdf (accessed on 30 November 2018).
54. European Commission. Communication from the Commission to the Council and the European Parliament. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52003DC0251&from=EN (accessed on 30 November 2018).
55. Denier, L.; Korwin, S.; Leggett, M.; MacFarquhar, C. *The Little Book of Legal Frameworks for REDD+*; Global Canopy Programme: Oxford, UK, 2014.
56. European Commission. Forests, Climate and People: EU Support To Combat Tropical Deforestation (REDD+) 2006–2014. Available online: https://ec.europa.eu/clima/sites/clima/files/docs/redd-plus_2014_en.pdf (accessed on 30 November 2018).
57. Norman, M.; Nakhooda, S. The State of REDD+ Finance. *CGD Climate For. Pap.* **2015**, 378. [CrossRef]
58. UNFCCC. Reducing Emissions from Deforestation in Developing Countries: Approaches to Stimulate Action. Available online: http://unfccc.int/resource/docs/2005/cop11/eng/misc01.pdf (accessed on 12 September 2018).
59. Buizer, M.; Humphreys, D.; de Jong, W. Climate change and deforestation: The evolution of an intersecting policy domain. *Environ. Sci. Policy* **2013**, *35*, 1–11. [CrossRef]
60. McDermott, C.L. REDDuced: From sustainability to legality to units of carbon—The search for common interests in international forest governance. *Environ. Sci. Policy* **2014**, *35*, 12–19. [CrossRef]
61. Pistorius, T.; Schaich, H.; Winkel, G.; Plieninger, T.; Bieling, C.; Konold, W.; Volz, K.R. Lessons for REDDplus: A comparative analysis of the German discourse on forest functions and the global ecosystem services debate. *For. Policy Econ.* **2012**, *18*, 4–12. [CrossRef]

62. Costanza, R.; D'Arge, R.; de Groot, R.; Farber, S.; Grasso, M.; Hannon, B.; Limburg, K.; Naeem, S.; O'Neill, R.V.; Paruelo, J.; et al. The value of the world's ecosystem services and natural capital. *Nature* **1997**, *387*, 253–260. [CrossRef]
63. Millennium Ecosystem Assessment, Ecosystems and Human Well-Being: Synthesis. Island Press: Washington, DC, USA,, 2005; Available online: https://www.millenniumassessment.org/documents/document.356.aspx.pdf (accessed on 30 November 2018).
64. TEEB. The Economics of Ecosystems and Biodiversity. Available online: http://www.teebweb.org/publication/teeb-for-policy-makers-summary-responding-to-the-value-of-nature/ (accessed on 12 September 2018).
65. Muradian, R.; Arsel, M.L.; Pellegrini, F.; Adaman, B.; Aguilar, B.; Agarwal, E.; Corbera, D.; de Blas, E.J.; Farley, G.; Froger, E.; et al. Payments for ecosystem services and the fatal attraction of win-win solutions. *Conserv. Lett.* **2013**, *6*, 274–279. [CrossRef]
66. Redford, K.H.; William, M.A. Payment for ecosystem services and the challenge of saving nature: Editorial. *Conserv. Biol.* **2009**, *23*, 785–787. [CrossRef] [PubMed]
67. Brown, M.I. *Redeeming REDD: Policies, Incentives and Social Feasibility for Avoided Deforestation*; Routledge: Abingdon, UK, 2013.
68. Chhatre, A.; Lakhanpal, S.; Larson, A.M.; Nelson, F.; Ojha, H.; Rao, J. Social safeguards and co-benefits in REDD+: A review of the adjacent possible. *Curr. Opin. Environ. Sustain.* **2012**, *4*, 654–660. [CrossRef]
69. Dooley, K.; Okereke, C. Distributive equity concerns in an international REDD mechanism: Towards a Copenhagen climate agreement. *Glob. Environ. Chang.* **2010**, *20*, 82–95. [CrossRef]
70. European Commission. Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions. Available online: http://ec.europa.eu/environment/circular-economy/pdf/circular-economy-communication.pdf (accessed on 30 November 2018).
71. COWI. Feasibility Study on Options to Step up EU Action against Deforestation. 2018. Available online: http://ec.europa.eu/environment/forests/pdf/feasibility_study_deforestation_kh0418199enn_main_report.pdf (accessed on 12 September 2018).
72. Eurostat. Sustainable Development in the European Union: Monitoring Progress towards the SDGs in an EU Context. Available online: https://ec.europa.eu/eurostat/web/products-statistical-books/-/KS-01-18-656 (accessed on 30 November 2018).
73. Mighty Earth. 2017. Available online: http://www.mightyearth.org/france-announces-new-five-year-climate-plan-that-puts-end-to-imported-deforestation-of-products-like-palm-oil-and-soy/ (accessed on 12 September 2018).
74. Jakarta Post. 2018. Available online: http://www.thejakartapost.com/academia/2018/07/06/the-eus-war-on-palm-oil-will-continue.html (accessed on 12 September 2018).
75. McDermott, C.L.; Sotirov, M. A political economy of the European Union's timber regulation: Which member states would, should or could support and implement EU rules on the import of illegal wood? *For. Policy Econ.* **2018**, *90*, 180–190. [CrossRef]
76. Fast, S.; McCormick, K. Biofuels: From a win–win solution to a wicked problem? *Biofuels* **2012**, *3*, 737–748. [CrossRef]
77. European Commission. A Modern Budget for a Union that Protects, Empowers and Defends the Multiannual Financial Framework for 2021–2027, COM/2018/321 final. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2018%3A321%3AFIN (accessed on 12 September 2018).
78. Newton, P.; Benzeev, R. The role of zero-deforestation commitments in protecting and enhancing rural livelihoods. *Curr. Opin. Enviro. Sustain.* **2018**, *32*, 126–133. [CrossRef]
79. Golub, A.A.; Fuss, S.; Lubowski, R.; Hiller, J.; Khabarov, N.; Koch, N.; Krasovskii, A.; Kraxner, F.; Laing, T.; Obersteiner, M.; et al. Escaping the climate policy uncertainty trap: Options contracts for REDD+. *Clim. Policy* **2018**, *18*, 1227–1234. [CrossRef]
80. COWI. Draft Feasibility Study on Options to Step up EU Action against Deforestation, Part 1 (Problems, Drivers, Objectives, Interventions). Available online: http://illegallogging-deforestation-conference.eu/wp-content/uploads/2017/06/Draft_Feasibility_Study-PART_I-.pdf (accessed on 12 September 2018).
81. European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.

2016. Available online: https://ec.europa.eu/digital-single-market/en/news/communication-commission-european-parliament-council-european-economic-and-social-committee-a-0 (accessed on 30 November 2018).
82. Lima, B.; Mairon, G.; Kissinger, G.; Visseren-Hamakers, I.J.; Braña-Varela, J.; Gupta, A. The sustainable development goals and REDD+: Assessing institutional interactions and the pursuit of synergies. *Int. Environ. Agreem. Polit. Law Econ.* **2017**, *17*, 589–606. [CrossRef]
83. Dimitrov, R.S. Hostage to norms: States, institutions and global forest politics. *Glob. Environ. Polit.* **2005**, *5*, 1–24. [CrossRef]
84. Pistorius, T.; Reinecke, S.; Carrapatoso, A. A historical institutionalist view on merging LULUCF and REDD+ in a post-2020 climate agreement. *Int. Environ. Agreem. Polit. Law Econ.* **2017**, *17*, 623–638. [CrossRef]
85. Dooley, K.; Ozinga, S. Building on forest governance reforms through FLEGT: The best way of controlling forests' contribution to climate change? *Rev. Eur. Community Int. Environ. Law* **2011**, *20*, 163–170. [CrossRef]
86. Aggestam, F.; Pülzl, H. Coordinating the uncoordinated: The EU forest strategy. *Forests* **2018**, *9*, 125. [CrossRef]
87. Juerges, N.; Newig, J. How interest groups adapt to the changing forest governance landscape in the EU: A case study from Germany. *For. Policy Econ.* **2015**, *50*, 228–235. [CrossRef]
88. Meijer, K.S. A comparative analysis of the effectiveness of four supply chain initiatives to reduce deforestation. *Trop. Conserv. Sci.* **2015**, *8*, 583–597. [CrossRef]
89. Hein, J.; Guarin, A.; Frommé, E.; Pauw, P. Deforestation and the Paris climate agreement: An assessment of REDD+ in the national climate action plans. *For. Policy Econ.* **2018**, *90*, 7–11. [CrossRef]

2

REDD+ as a Public Policy Dilemma: Understanding Conflict and Cooperation in the Design of Conservation Incentives

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Received: 24 September 2018; Accepted: 1 November 2018; Published: 20 November 2018

Abstract: Command-and-control policies are often criticized as insufficient to tackle tropical deforestation. Over the past two decades, both academics and policy-makers have promoted incentive-based policies, notably REDD+ (Reduced Emissions from Deforestation and forest Degradation), as attractive alternatives to curb forest loss, while also potentially contributing to the poverty reduction of forest-dwelling populations. Governments have been the driving force behind the largest incentive-based forest conservation programs in Latin America. Many science-based recommendations on how to design effective incentive-based policies have, however, not found much resonance within policy circles. To understand the gap between recommendations and practice, it is important to analyze how these schemes are designed towards achieving environmental and non-environmental outcomes. To this end, we analyzed the comprehensive history of governance dynamics behind two government-led incentive schemes in Ecuador and Peru. We found that electoral interests and bureaucratic politics exerted pressure on policy design teams, which eventually traded off long-term societal efficiency concerns against short-term administrative goals. Priority was often given to non-environmental concerns, due to perceptions of political feasibility, the influence of non-environmental government agencies, and beliefs in particular government roles or public response. These findings are especially relevant for scholars studying the design, implementation and impacts of incentive-based conservation policies, and for practitioners aiming to enhance policy efficiency.

Keywords: environmental governance; forest conservation; climate change mitigation; public policies; Amazon

1. Introduction

Despite the sluggish progress in international climate policy, Reduced Emissions from Deforestation and forest Degradation (REDD+) has become an important international source of funding for forest conservation since the mid-2000s. REDD+ was conceived as a means to harness the allegedly high potential for cost-effective emissions reductions in the forestry sector [1]. As international negotiations went on, countries with forest reserves prepared to receive international transfers for REDD+ implementation.

Incentive-based policies, such as Payments for Environmental Services (PES), were frequently proposed mechanisms to implement REDD+ on the ground [1]. Many PES initiatives were born over the last couple of decades, often preceding official decisions at the United Nations Framework

Convention on Climate Change (UNFCCC) on REDD+. Existing PES schemes can thus provide lessons to inform the implementation of REDD+ on the ground [2,3].

Governments were often the driving force behind large REDD+ and PES programs [4]. Arguably, due to economies of scale and the possibilities for integration with other sectoral policies, governments are bound to be at the forefront of adopting PES as a large-scale forest conservation tool. Early PES research, however, suggested that government-led PES schemes tend to be less cost-effective than private PES initiatives [5]. Emerging impact evaluation studies confirmed this conjecture, showing that the effectiveness of selected schemes in reducing deforestation has been low [6].

One of the reasons singled out for the low effectiveness of government-led PES is the existence of "major political-economy obstacles" [7] (p. 11) and a "need to accommodate political pressures" [8] (p. 260). Early PES research mostly focused on the technical aspects of designing payments to provide additional environmental services cost-effectively. In recent years, however, a growing body of literature has investigated the complexities of REDD+ and PES policy-making processes, beyond technical aspects. This research focused on the political contexts and discourses related to REDD+ in several countries [9–16], multi-level and polycentric governance issues in REDD+ [17–20], the institutionalization processes of REDD+'s technical aspects such as monitoring and benefit-sharing [21,22], and national case studies on the governance of REDD+ and PES design and implementation [23–28]. This paper seeks to add to this body of literature, accounting in detail for how political processes can shape and transform the design of incentive-based environmental policies.

In a previous article, we [29] analyzed the factors explaining the political dynamics of the adoption of three incentive-based forest conservation programs, the National Program of Forest Conservation for the Mitigation of Climate Change—Programa Bosques—in Peru, the Socio Bosque program-in Ecuador, and the System of Incentives for Environmental Services—SISA—in the state of Acre, Brazil.

Here, we revisit the Programa Bosques and Socio Bosque programs to zoom in on their policy-design processes. We show why and how context-specific political and bureaucratic constraints affected their design, focusing especially on how those constraints led to deviations from efficiency-oriented recommendations in the literature. The two programs were chosen for being both well-known and comparable examples of large-scale PES programs with clear potential for REDD+.

Section 2 presents the conceptual framework used in our analysis. Section 3 describes the history and analyzes the processes that led to the design features of the programs. Section 4 concludes the paper, discussing how the findings are relevant for forest conservation and REDD+ policies. The Supplementary materials provide a factual description of the programs, supporting the understanding of Sections 3 and 4.

2. Conceptual Framework

Some articles have utilized institutional frameworks for analyzing PES schemes [30,31], but few have explicitly drawn insights from public policy theories focusing on the motivations of governments [24,32]. In this section, we present a conceptual framework for our two case studies that is derived from different public policy theories. Drawing eclectically on various theories of policy science, our framework does, in Ostrom's words, "provide the most general list of variables that should be used to analyze institutional arrangements" [33] (p. 26).

Policy design is more than a technical exercise of matching appropriate responses to given problems. It is a complex and eventually ambiguous product of interactions and interdependencies occurring, as posed by Howlett [34], at three levels of decision making (see Figure 1). At an abstract level, we label "overarching preferences" (by Howlett, called "macro-level") the general statements of "government aims and ambitions in a specific policy area" and the "long-term preferences of government in terms of organizational devices to be used in addressing policy aims" (p. 75). At the level of "operational policy objectives" (Howlett's "meso-level"), we observe "the specific types of governing instruments to be used to address program level objectives" (ibid). In this article, however,

our focus is on "specific, on-the-ground micro requirements to attain policy objectives the settings of policy tools required to attain policy targets." (ibid). Choices at this level of "specific design decisions" ("micro-level") will determine the details of how a policy instrument will ultimately be shaped. That does not mean we ignore the importance of long-term policy preferences, but that we seek to analyze policy processes that occurred in a shorter time span. Hence, we interpret long-standing policy preferences (e.g., an marked focus on social policy in Ecuador) as a given policy context in which decisions are made. Figure 1 illustrates the framework and Table 1 describes its elements.

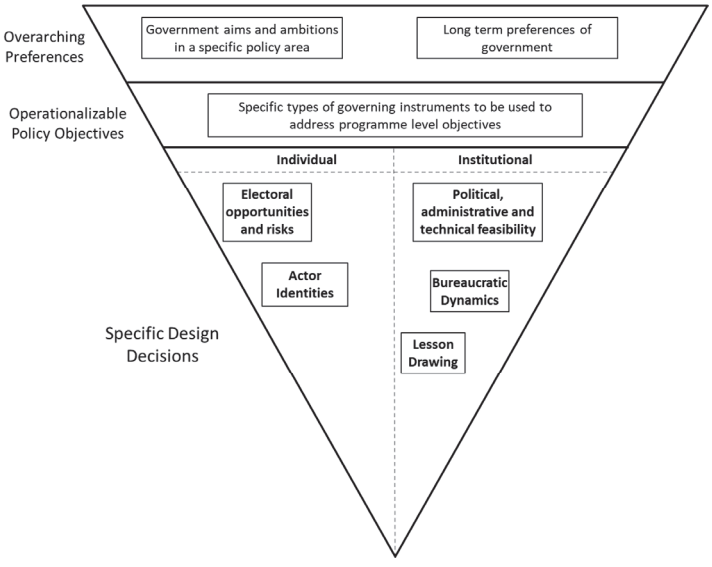

Figure 1. The conceptual framework. Source: elaborated by the authors.

Table 1. The concepts of the policy theory applied.

Explanatory Element	Summary Description	Theoretical Tradition	References
Electoral opportunities and risks	Politicians try to maximize power and rank short-term interests over long-term consequences. Policy design aims at maximizing electoral votes. Bureaucrats seek to maximize agency budgets, career advancement, and self-favored policies.	Public Choice Theories	[35–37]
Actor identities	Expands the actors' motivations from pure utility maximization towards their idiosyncratic characteristics, e.g., education, commitment to service, expertise, tenacity, and political skills.	Multiple Streams Framework (Policy Entrepreneurs), Street Level Bureaucracy	[38,39]
Political, administrative, and technical feasibility	The institutional context in which decisions are made. Political feasibility factored into design decisions as a guide to action, or as an explanation for previous behavior. Administrations prefer policies that are less costly to design and run, especially in low-priority sectors with limited resources and personnel.	Institutionalism	[34,40,41]
Bureaucratic dynamics	Relations between government agencies involved in a policy area. Coordination capacity, internal turf battles, and jockeying for influence will often influence the design processes.	Institutionalism, Organizational Theory	[42,43]
Lesson-drawing	Policymakers will often look at other jurisdictions to draw 'tried and tested' policy options. Lesson-drawing occurs as a more or less intact adoption of a program already in effect in another jurisdiction, as the combination of several policies, or as simple inspiration/ intellectual stimulus.	Institutionalism	[44,45]

3. The Design of Public PES Schemes: Socio Bosque and Programa Bosques

This section describes how academic recommendations for cost-efficient PES were considered in the design of each program, and analyzes the underlying decision-making processes. Table 2 summarizes the section. A detailed description of the programs is provided in the Supplementary materials. Our sources of analysis were personal interviews with current and former policymakers who were directly or indirectly involved with program design, and a thorough scrutiny of design documents, as well as triangulated opinions on (and external analyses of) how design decisions were made and implemented.

3.1. Conditionality, Monitoring, and Baselines

Conditionality means that payments should only be made if environmental services (ES) are being provided, or a proxy activity clearly linked to the provision of ES is implemented. It is the defining characteristic of PES programs, the one that distinguishes them from more traditional subsidy programs [5,46]. Conditionality is the combination of compliance monitoring ("efforts to detect non-complying participants, typically combining remote-sensing technologies with on-site ground truthing") [46] (p. 146), and sanctioning non-compliance, usually by suspending or withdrawing payments. PES programs should also construct baselines to enable the understanding of what would have happened without the scheme and to gauge additionality.

Socio Bosque's design contains clear conditionalities attached to payments. Program planners emphasized the need for simplicity and clarity of conditionalities, given that long administrative procedures would put off many potential beneficiaries, and due to concerns with administrative capacities in the long term (Appendix A: Interview 5). When the program was created, no country-wide forest monitoring system or forest cover baselines existed. The design teams decided to set up an extensive monitoring system and a baseline study as one of the program's core components (Interview 5), instead of setting up the systems before the beginning of the payments. Specific property/community baselines were developed as a requirement for enrollment so that compliance could be monitored.

Monitoring activities were implemented through the analysis of satellite imagery and field verification of zones which are deemed as being potentially threatened. According to a recent monitoring report (December 2015), 89.92% of the enrolled area has been analyzed [63]. Also in 2015, field verification identified 6.6% of the areas as non-compliant with the program's regulations (ibid). Additionally, a country-wide baseline has been completed and published after the start of the program [64].

The creation and design of Programa Bosques were inspired by the Juntos conditional cash transfer (CCT) program [29], so the inclusion of conditionalities was integral to Programa Bosques (Interview 12). The rationale for the definition of the conditionalities was to ensure that communities would not perceive the incentive as a hand-out, and that they should be easily understandable (Interview 12). The envisaged forest cover monitoring system was not complete at the beginning of the program, as satellite images of enrolled communities were not yet available. The images were later acquired, on a yearly basis, with the support of the German Agency for International Cooperation (GIZ). To monitor compliance, a participatory mapping was made together with the communities, including the definition of the zone to be put under conservation, later to be complemented with satellite images. The first cash transfers were provided upfront, without considering forest cover dynamics. The communities used that money to implement sustainable productive activities (see Section 3.6 below, and the Supplementary materials). By the end of the first year, compliance monitoring was performed: if the communities had complied with all conditionalities, they would be eligible for the second payment—and so on for the following years (personal communication, R. Giudice, 8 April 2018).

Table 2. The design for cost-efficient PES (Payments for Environmental Services): theoretical recommendations vs. policy choices and their implementation.

Main Theoretical Recommendation		References	Socio Bosque (Ecuador)	Programa Bosque (Peru)
Conditionality, Monitoring, and Sanctions	Payments to be conditional on ES provision (or proxied land uses), and non-compliance to be sanctioned. Baselines, controls and monitoring required to evaluate attributable outcomes.	[7,8,46–51]	Environmental (e.g., maintain forest cover in enrolled areas) and administrative (e.g., accountability reports) conditions to payments. Baselines and monitoring system to be fully developed during implementation. Eventual payment suspensions in case of continuous administrative and environmental non-compliance.	
				Upfront payments were provided without performance-based monitoring. Subsequent payments based on conditionality compliance. Sanctions to non-compliant participants are being applied.
Poverty reduction and equity (incl. participation [1])	PES schemes should focus primarily on ES provision. Poverty alleviation can be a co-benefit. Negotiated, flexible PES schemes are more equitable.	[7,46,48,52–54]	Poverty reduction is one of the main stated objectives and a parameter for targeting. The participatory process is largely absent (top-down design). Voluntary enrollment.	
Spatial targeting in the selection of ES (environmental services) providers	Schemes should target enrolment of areas with high ES provision potential and high risks of ES loss, and low provision costs.	[7,47,48,55–58]	Participants self-select which parts of their land they set aside for conservation.	
			Based on the assumed level of the threat, environmental service, and level of poverty. Was applied only after there were more enrollment requests than resources (from 2012).	Region and community targeting. Based on primary forest area, deforestation rate and poverty incidence rate and closeness to access alternatives (e.g., roads, cities). Targeting has not been homogeneously followed by the program, with some communities not ranked as priority areas being enrolled
Payment size and modalities	Payments should vary according to the value of ES and their provision costs (i.e. opportunity costs) to maximize impact for a given program budget.	[46,51,59]	Differentiated payments. Based on the enrolled area size and the type of vegetation and ownership. The amounts paid to beneficiaries were changed during the implementation to reflect property/community sizes and serve as a proxy for opportunity costs.	Undifferentiated payments. Based on the enrolled area size.
Integrated Conservation and Development Program (ICDP)-type components	PES have been conceived as alternatives to ICDPs. Combining PES with development support can confuse program goals, inflate costs, and eventually compromise conservation outcomes.	[7,48,60–62]	Payments contingent on the development of ICDP-type activities aiming at generating income (not applicable to individual landowners in Socio Bosque).	

[1] Participation of multiple stakeholders in program design is a prominent theme in PES debate and practice. It is commonly discussed, together with poverty reduction, within the broad theme of "equity".

Data on conditionality enforcement has not yet been consolidated, but according to our personal communication with program staff, some sanctions for non-compliance have been imposed. Ten communities were evicted from the Program between 2011 and 2014, and a few more were suspended for one year and rejoined in the following year. The main reason for eviction has been the use of cash transfers for reasons not included in the investment plan, which details how beneficiaries are planning to use the money transferred from the program to carry out productive projects expected to improve their welfare. Other reasons were deforestation beyond the allowed threshold (0.3% of the area committed for conservation over the 5 years of the conservation agreement [65]) and receiving a fine or sanction from another forestry regulatory office (personal communication, R. Giudice, 8 April 2018).

While conditionalities were swiftly agreed upon in both programs, several contextual factors explain the decision to provide initial upfront payments and only condition-subsequent payments on compliance. Both programs have the dual objective of conserving forests and reducing poverty (see Section 3.2) and intend to achieve those objectives by implementing ICDP-like sustainable productive activities (see Section 3.6). Therefore, upfront payments to initiate those activities are an integral part of the programs' intervention strategies. Additional factors help to explain that design feature. In Ecuador, the idiosyncratic characteristics of President Rafael Correa were relevant, as he pressured for quick government action in various policy areas. From the beginning of his mandate, he was trying to implement fundamental changes in Ecuadorian institutions. One of the core changes observed in the country was the strengthening of the executive power's capacity to formulate public policies, to the detriment of other institutions such as Congress [66,67]. At the base of his political changes was a new constitution, which the president hoped to approve in a referendum. The public debate on the constitution overlapped with the design process of Socio Bosque. The constitutional referendum happened in September 2008 and Socio Bosque officially started in November 2008. To ensure support, Correa intended to demonstrate a commitment to quick and bold action by the government. Therefore, the political context in which the design team worked urged for a quick start of the payments (Interview 5).

In Peru, a similar pressure for quick completion of the design process existed, but the political feasibility and bureaucratic dynamics were more relevant factors. First, the government aimed to mend its relations with indigenous populations, which were strained due to confrontations between police forces and indigenous populations known as Baguazo [29,68]. A dragging design process would delay the beginning of payments, which was understood to be potentially counterproductive to that aim (Interview 21). In addition, the Environment Ministry (MINAM) was a new entity in the government (created in 2008) and sought to demonstrate efficiency to a skeptical Council of Ministers (Interview 24).

3.2. Poverty Reduction

PES have been considered attractive to conservation practitioners and policymakers as a possible win-win solution for tackling environmental problems and contributing to poverty alleviation concomitantly [69]. There are, however, often tradeoffs between both objectives [46,51]. From an efficiency perspective, those who should receive payments are the ones who pose a credible (or, at least, credibly projected) threat to the provision of ES [7,47]. For that reason, several researchers note that poor land users, who usually have small plots and few means to seriously threaten themselves and/ or protect their environment against outsiders, will often not be the most efficient providers of ES [48,52]. Programs that target payments to poorer populations risk having higher costs and low environmental additionality. For that reason, many authors have stressed that the PES schemes should not be promoted as poverty reduction tools [48,52,53]. In other words, "poverty alleviation is an important side objective, which can be pursued through timely interventions, but it should never become the primary objective" [7] (p. 22). On the other hand, some authors argue that the existence of interdependencies between effectiveness and equity outcomes [70] can make poverty reduction a necessary condition for ES provision [71].

Contrary to most recommendations in the literature on cost-efficient PES, poverty reduction was a central concern in Socio Bosque's design, as it was in its adoption [29]. Several of the design provisions in Socio Bosque aim to benefit poor population segments. The decision to include communities in the program was driven by the goal to provide them with cash transfers [72]. Welfare concerns also guided the definition of a poverty parameter for targeting, and the interest in fostering potential income-generating activities also motivated the inclusion of ICDP-type activities (see below). The program, however, was not able to reach many of the poorest inhabitants of forests because, for legal reasons, it can only enroll participants with formal land titles (Interview 5).

The design process had a limited formal participation of national actors outside of the government [73,74], except for the partnership with Conservation International throughout the design process and informal contacts with some potential beneficiaries, as well as local governments already implementing PES projects (Interview 5). The lack of participation design was justified by the program designers with the voluntary enrollment in the program, allegedly deeming the participation of civil society actors unnecessary (Interview 5). Additionally, the design team understood that a consultation process would hinder the program's quick deployment, as there were pressing requests from the president's office to get the project started quickly ([73], interviews 5, 12).

Poverty reduction concerns were also central to the design of Programa Bosques. Similar to Socio Bosque, they were key factors in design decisions on targeting, payment system definition and, crucially, the introduction of ICDP-type activities (Interview 21, 23). We could not, however, find evidence on the extent to which these design elements were thoroughly discussed by the design team, or if they straightforwardly adopted Socio Bosque's design model. The design process of Programa Bosques also did not count with the wide participation of non-government stakeholders. A few meetings were held with the NGO Inter-Ethnic Association for the Development of the Peruvian Forest (AIDESEP) to discuss some of the initial drafts of the program (Interview 22), but we could not infer how much of AIDESEP's input had been adopted. The design team also reasoned that since participation in the program is voluntary, a thorough participatory process would make the design process unnecessarily time demanding (Interviews 21, 22, 23).

The centrality of poverty reduction concerns in both programs is, perhaps unsurprisingly, the most outstanding deviation from policy recommendations. Improving the living conditions of the poor has been the main overarching declared objective of Latin American governments for many years, and more markedly since the 2000s, with the emergence of leftist-populist governments all over South America [75,76]. Even before those developments, CCT programs started proliferating in Latin America. Studies found that voters tend to reward governments that implement targeted social assistance programs [77–79], at least in the short term [80]. Subsidies for forest conservation can, in addition, also legitimately benefit geographically marginalized rural populations that are otherwise hard to reach for central states.

Additionally, pro-conservation action could be popular with an environmentally conscious electorate. Our respondents agreed that conservation remains a low priority for voters, although there were no consistent studies or opinion polls found on the voters' preferences to back that perception. However, there is a documented increasing trend in environmental movements' activity and in the public environmental awareness in the region [81–83], which may have influenced the adoption of the programs, despite it not being explicitly recognized by respondents. In any case, an increased environmental awareness in the public does not necessarily mean that forest conservation would overtake welfare issues as a priority for voters. Hence, governments should have a political interest in associating conservation and welfare policies. It is fair to say that both programs have been designed with the intention of being perceived as a hybrid of environmental and social policies, with the latter probably being in the driver's seat.

3.3. Spatial Targeting in Selecting Participants

Since funds for PES schemes tend to be limited, it is crucial to carefully determine where interventions will take place and which actors will participate in them. Spatial targeting of PES should consider both benefits and costs in site selection [51], mainly focusing on areas with a high-ES density [46,55], high deforestation risk [55,56], and low costs relative to the service levels [84]. Appropriate targeting is relevant to ensure higher additionality of a PES scheme and its cost-effectiveness [46,55].

Socio Bosque "has not specifically targeted enrollment to generate increased outcomes in prevented deforestation and provision of environmental services" [85] (p. 104) but developed targeting (prioritization) criteria in their operational manual to define who would be enrolled first. The prioritization criteria used are the level of threat, proxies for environmental service provision, and poverty levels [86] (see Supplementary materials for detailed targeting criteria). Prioritization was not intended to be applied from the beginning of the program, but only after there was more demand for participation than the supply of funds available for new enrollments, which happened in 2012 [87].

The targeting process at Programa Bosques is divided into two steps. The first is the selection of which provinces are the priorities for conservation. Three criteria are considered at this stage, (a) the total area of primary forests, (b) deforestation rates, and (c) the poverty incidence rate. The second is the selection of which communities within the previously prioritized Provinces should take priority in participating in the program. The indicators used in this phase are (a) the total area of primary forests, (b) the percentage of conserved primary forests, and (c) the closeness to transport routes [88] (see Supplementary materials for detailed prioritization criteria). The selection of the initial Provinces, at the Valley of the Apurímac and Ene Rivers (VRAE) region, however, did not follow the prioritization criteria and was instead motivated by the government's interest to benefit a region with a history of poverty and political conflict (Interview 21). Furthermore, according to information provided by the GIZ-Peru staff (personal communication, R. Giudice, 8 April 2018), the criteria for prioritization of communities has not been homogenously followed by the program. In 2011, for example, the program prepared a ranking of 102 communities based on the prioritization criteria, with the first 50 being considered a priority for enrollment. In that same year, 27 communities voluntarily applied for enrollment, of which 17 were enrolled by the end of that year. Only 10 of those 17 were among the list of 50, and five were not even ranked within the list of 102 communities.

Targeting is, politically, one of the trickiest aspects of the design of a PES program, as it will ultimately define who participates—and eventually benefits. Consequently, Ecuador and Peru developed targeting schemes for selecting participants, but enrolled participants with a wider range of characteristics. Respondents indicated technical reasons for their selection of targeting strategies. Some of the data for the whole country that were required to implement targeting were lacking. For that reason, the start of program implementation would allegedly have to be delayed for a few months while the programs were urged by higher authorities to deliver payments as soon as possible (Interview 5, 17). There were also concerns about political feasibility and medium-term electoral strategies of the governments. Targeting conservation incentives to maximize cost-effectiveness may generate a perception of unfairness if the targeting criteria discriminated against poor landholders or good forest stewards. A perception of unfairness, justified or not, may jeopardize program acceptance, undermine the government's popularity in the intervention area, and cause rifts among the population. Additionally, the number of enrolled participants and the size of the forest areas under the programs are arguably regarded as the most important early measures of success for the programs since measurements of actual deforestation reductions, additionality, or improvements in incomes of enrolled beneficiaries are, at the time of writing, incipient at best.

3.4. Selection of Plot-Level Conservation Areas

Once the participants were selected, their contractual conservation areas also needed to be defined. When landowners self-select those, they will likely choose from the start those that are least

threatened (remote, inaccessible, steep, etc.), where deforestation risks are minimal. Payments would, thus, make no difference: the so-called adverse selection bias [89] would apply. One PES design recommendation is, therefore, to make conservation agreements for the entire land area of participants, so as to counteract self-selection bias.

In both Ecuador and Peru, however, the participants themselves define what part and share of their land would be enrolled in the programs, whereas deforestation could legally continue on other lands. Respondents argued that the decision to allow communities and individuals to self-define conservation areas was taken to maintain coherence with the voluntary nature of the programs (Interviews 5, 8, 24).

Electoral interests are likely to have also played a role here. A top-down definition of eligible areas could have been erroneously perceived as a violation of land use rights, especially when community conservation agreements were made—a problem also observed with the ejidos in Mexico [90]. The design teams reckoned that, even in a context of voluntary enrollment, a perceived interference in land use decisions would discourage participants from enrolling (Interview 5, 17). In Ecuador, the team was indeed aware of reports of previous activities in which communities felt discouraged to participate when they perceived that their freedom to make land use decisions would be hindered by conservation incentive projects, as described in Profafor and GIZ [91]. Another study [92] that analyzed the factors affecting desire to participate in Socio Bosque, focused on páramos areas. It found that "a fear of land expropriation" was one of the most important factors triggering a lack of desire to participate, together with "insufficient incentive payments to cover opportunity costs" (p. 128). Similar notions were reported in a study of the Ecuadorian Amazon region, where concern with expropriation was also reported, with a "fear that at the end of the 20-year contracts, the forested land would revert to the government. As stated by a male non-participant, 'some neighbors fear Socio Bosque is a trick, a way for the government to take possession of your land'" [93] (p. 7).

3.5. Payment Differentiation

The PES literature recommends differentiating payments according to variable ES benefits and costs of ES provisions across participating landowners [51]. For the latter, payments may conveniently be aligned with landowner opportunity costs, if these can be approximated [59]. Payment differentiation is likely to increase the environmental effectiveness of a PES scheme [94] and may also make the distribution of benefits more equitable if differential ES provision costs among participants are used as an equity criterion [46].

Opportunity costs were not calculated for the definition of payment levels in Ecuador. The project team considered that "different levels of incentives depending on the specific location of a landowner would be a cause of intense social debate and would not be politically viable" [72] (p. 535), and that a lengthy process to estimate opportunity costs would reduce the political momentum for program adoption [73]. Opportunity costs and other design parameters were discussed during consultations with international PES experts, including individuals from the Mexican and Costa Rican programs, at an expert meeting held in Hacienda Cusin (Otavalo), just a few weeks prior to the launching of the program. The experts suggested several alternative ways to use opportunity costs for payment differentiation, including a straightforward road zoning proxy system (Interview 13). Representatives of the Costa Rican delegation allegedly argued that the explicit use of opportunity costs could be politically complicated and unnecessary. As a reason, they suggested that such a differentiation is hard to communicate and could lead to complaints about undue favoritism. The Socio Bosque team thus decided not to follow the recommendations provided by the academic specialists (Interview 2) on opportunity costs. There was, consequently, no thorough answer on the definition of the specific payment values used by Socio Bosque. Respondents stated that the design team took into consideration budgetary possibilities and tried to offer the highest possible payment for participants (Interviews 2, 5).

However, since one of us (Wunder) participated as invited PES specialist in the expert meeting to inform the design of Socio Bosque, some triangulation of the interview information is possible here.

The meeting was held just a few weeks prior to the launching of the program, which was politically timed to occur around the time of the constitutional referendum (see above). In practice, significant design choices such as payment differentiation were, at this stage, no longer possible, nor was strong advice in that direction necessarily desired by the ministerial staff. National experts from Conservation International, closely working with the Ministry on program design, voiced also a clear framework for what was or was not politically feasible at this stage of the process. This caused some friction with some of the international experts, feeling their participation from the outset was being used as a legitimizing procedural tick-off, rather than a genuine technical input into program design—which, in all major respects, had de facto already been predetermined.

Nevertheless, the meeting perhaps raised some awareness among Socio Bosque stakeholders about the importance of opportunity costs, which influenced the future implementation process. The area-based payment differentiation was devised as a proxy for opportunity costs, with the "assumption that opportunity costs decrease when the area increases, since access becomes more difficult in larger areas", but "was also a political decision to maximize the limited budget that was available" [95] (pp. 1173–1174). Likewise, the changes in the payments structure introduced in October 2011 showed at least an implicit recognition of potential efficiency gains from taking opportunity costs into consideration. The program added a differentiation between individual and collective lands, and between páramos and other vegetation types, as well as adding a special category for properties under 20 ha. The new structure increased per-hectare payments for communities and kept original values for individual landowners, except in the under 20ha new category [96,97] (for additional information, see Supplementary materials). Changes were also due to a decrease in the rhythm of new participants signing up, especially in páramos areas [95]. The initial values were loosely based on the incentive values of similar programs implemented in other countries (e.g., Mexico and Costa Rica) and on the budgetary possibilities of the program (Interview 5).

The Programa Bosques did no adopt a differentiated payments structure, although it reportedly drew explicitly on lessons from Socio Bosque. The interviews and program documentation did not yield solid evidence for specific reasons why an undifferentiated payment structure was chosen, or why opportunity costs were not considered. According to the respondents in Peru, the specific amount of the payment was defined largely for the sake of simplicity, with the value of 10 Soles per ha/year being deemed as easy to understand and communicate, and within a realistic budgetary range (Interviews 21, 23). However, in an exchange with international scientists (including co-author Börner) prior to launching the program, government representatives evoked similar fairness arguments against payment differentiation as in Ecuador.

3.6. ICDP-Type Components

PES were conceived as "alternatives to the more indirect pro-poor investments for transforming livelihoods such as ICDPs" [98] (p. 134). ICDPs have been significantly widespread since the 1990s, with the aim of promoting conservation by providing "alternative sources of products, income, or social benefits" [60] (p. 1718). ICDPs, however, have shown a mixed track record, at best, in terms of achieving their proposed conservation objectives and, crucially, provide payments that are not conditional on the objectives set [60,99]. Additionally, combining PES with development support can confuse program goals, inflate costs, and eventually compromise conservation outcomes [7,48,60]. Nevertheless, the 'PES-positive' literature sees possible benefits for ICDP-like activities, if they are approached creatively, especially by adapting conditionalities [7]. Additionally, some activities that can be promoted under a PES scheme, "for example switching to agroforestry or silvopastoral practices", may "become profitable for the landholder after some years of implementation", inducing "the landholder to adopt the environmentally friendly practice" [51] (p. 149).

Both Socio Bosque and Programa Bosques, however, included ICDP-type components in their design, which they call productive projects or activities (see Supplementary materials). That means that the incentive provided cannot be freely utilized by the communities, but must be invested in

activities intended to generate income, making the program ultimately a source to finance small-scale, community-led ICDPs. The explanation for the lingering interest in ICDP-type activities is manifold. Program designers believed that the payments should not appear to be handouts, but must become seed funds for the construction of long-term solutions for the communities' socioeconomic issues (Interview 5, 23). From a technical standpoint, the fact that the money is given to a community, with a political/hierarchical structure of their own, tying payments to reportable productive activities was seen as the best way to accountably spread benefits inside the community, counteracting elite capture and misuse. However, the subsequent implementation shows that these expectations were not always met. Early analyses of Socio Bosque show that productive activities have not always ensured transparent and informed decision making in communities [74] and that "some communities are having difficulties distributing the costs and benefits of participation in Socio Bosque fairly" [100] (p. 8), reporting evidence of "intracommunal power imbalances and elite capture" [95] (p. 1180).

In Peru, bureaucratic intra-governmental dynamics also played a role. The ability to demonstrate the investment of payments in productive activities came to be an important asset in negotiations with the Ministry of Economy and Finance (MEF), which was much more willing to approve budgets to a program with a stimulus to economic activity than a transfer for 'not doing something' (i.e., avoiding deforestation) (Interview 24). This led the design team to look to Socio Bosque's concept of investment plans attached to the payments (see Supplementary materials). The persistence of ICDP-type components, therefore, shows that the idealized view of PES as a poverty-environment "win-win" solution [69] was relevant for the design of the programs, especially to ensure the support of non-environmental agencies.

4. Conclusions

As we have seen, the centrality of development, welfare and poverty reduction considerations aimed at ensuring local and intra-bureaucratic support as determinants of policy design choices have produced a notable deviation from a set of commonly applied PES policy recommendations. The strong presence of ICDP-type components in the programs is also questionable with regard to cost-efficiency. Crucially, failure to account for heterogeneity in ecosystem service provision and opportunity costs in the design of payments leaves ample scope to the adverse self-selection of non-threatened forest areas into the program, allowing for several of the enrolled areas to generate sub-optimal conservation benefits in relation to the resources invested. Indeed, a preliminary study suggests that Socio Bosque "has provided little conservation additionality in terms of the prevented deforestation" [85] (p. 112); a more recent rigorous study showed the program to reduce deforestation by 1.5% in the areas that received the program's direct payments [101], while Börner et al. [102] show that Programa Bosques is designed suboptimally both in terms of conservation effectiveness and net benefit distribution. Additionally, an evaluation of the socioeconomic impacts of Programa Bosques shows that, despite the increase in the scale of production, there is no increase in the value of product sales by the beneficiaries, due to the low returns to investment and limited market articulation [103].

On the other hand, the environmental components of the programs also had more indirect positive outcomes. In Peru, the deforestation monitoring capacity has been strengthened through the activities of Programa Bosques [104,105]. Likewise, the program has improved the cooperation of MINAM with provincial governments on environmental issues. Socio Bosque has also helped to improve information on forests in the country, and the program became a blueprint for other environmental policies in the country (e.g., mangrove protection and biocommerce). Moreover, the changes in the payment structure of the program show a move towards an implicit recognition of opportunity costs as an element to improve the efficiency of the scheme.

Our findings are to some extent in line with the literature that highlights the importance of local contexts in REDD+ and PES [10,15,16,25,106]. Karsenty and Ongolo [9] discussed the difficulties of implementing REDD+ in "fragile states", and we showed that even in better-functioning democracies and administrations, political and bureaucratic constraints may get in the way of cost-efficient

PES and REDD+ design. Despite the "globalist, homogenizing nature of REDD+ guidelines" [26] (p. 78), reviews on implementation show a patchwork of conceptualizations, guidelines, and forms of institutionalization [10,15,107]. However, we agree with Angelsen [4] (p. 238), that "the core idea of REDD+" remains "to apply conditionality and make payments to countries (and projects) based on performance or results". To prevent REDD+ from becoming simply the 'conservation fad' that some authors identify [108,109], efficiency-oriented recommendations must remain central to what program designers, especially within the REDD+ policy mix, should strive for [46,51], without losing sight of the potential equity risks [14].

The design of the programs has shown several politically and administratively sensitive issues that will be at the heart of the design of many 'multi-objective' REDD+ program. The active promotion of non-carbon benefits for REDD+ and PES means that any discussion on the design of programs will experience similar political repercussions and pressures as the ones we found in Socio Bosque and Programa Bosques. PES and REDD+ are marred with tradeoffs and risks [10,14,69], which will require explicit recognition and action [4]. Transparent priority setting in public policy, independent decision-making capabilities, funding for agencies responsible for REDD+ or PES programs, and sound technical provisions are jointly needed to ensure that the schemes efficiently generate emissions reductions.

It is likely that governments will remain the main promoters and funders for PES and REDD+ in the foreseeable future. Our findings help explain why the policy-making dynamics, such as intra-governmental conflicts and power imbalances between sectors and agencies, are key factors leading to the prevalence of multi-objective REDD+. It remains to be seen how governments will balance pressures for non-carbon benefits and equity considerations by ensuring the necessary cost-efficient emissions reductions, which will certainly be required for eligibility in future REDD+ funding schemes. Instead of reproducing an unrealistic "win–win ecological modernization discourse" [15] (p. 133), governments will likely better fulfill their REDD+ agendas by recognizing and addressing the political tradeoffs inherent to multi-objective REDD+.

It is clear from our findings that not enough emphasis is placed on adapting technical recommendations to the contexts in which they must be turned into real policies. Indeed, better knowledge of what constitutes a favorable public policy environment for effective REDD+ can help to avoid investments in doomed policy programs. Without doubt, for PES programs to be cost-effective REDD+ vehicles, intra-governmental conflicts and imbalances as well as the short-term planning horizons of politicians and bureaucrats, will have to be jointly addressed with technical challenges. Strategies to enhance program efficiency, therefore, should be based on a careful evaluation of context-specific political and institutional constraints, if both environmental and social objectives are to be reached.

Author Contributions: H.R.d.C. and J.B. designed the study; H.R.d.C. collected and analyzed the data; H.R.d.C., J.B. and S.W. wrote the manuscript.

Funding: This research was funded by the Robert Bosch Foundation (grant 32.5.8043.0012.0), the German Federal Ministry for Economic Cooperation and Development (grant 81180343), Norad, and the European Commission (grant DCI-ENV/2011/269520). And the APC was funded by the German Federal Ministry for Economic Cooperation and Development (grant 81180343).

Acknowledgments: The helpful comments of the reviewers are appreciated and the remaining errors and omissions are responsibility of the authors.

Appendix A. List of Respondents

Ecuador

1. Foreign technical cooperation staff
2, 3, 4. Socio Bosque staff
5, 6. Former high-level Environment Ministry (MAE) decision makers
7, 8, 9, 10. NGO technical cooperation staff
11. Local NGO staff
12. Environmental Policy specialist
13. Former high-level MAE decision maker
14. Environmental Policy specialist

Peru

15, 16. Foreign technical cooperation staff
17, 18, 19, 20, 21. Programa Bosques staff
22. Former Programa Bosques director
23. Former Programa Bosques staff
24. Former high-level MINAM decision maker
25. Former Programa Bosques staff
26. MEF staff
27. Social Development ministry staff
28. High-level MINAM decision maker

References

1. Pagiola, S. *Using PES to Implement REDD*; PES Learning Paper, 2011-1; World Bank: Washington, DC, USA, 2011.
2. FONAFIFO; CONAFOR; Ministry of Environment of Ecuador. *Lessons Learned for REDD+ from PES and Conservation Incentive Programs. Examples from Costa Rica, Mexico, and Ecuador*; World Bank: Washington, DC, USA, 2012.
3. Wunder, S. Can payments for environmental services reduce deforestation and forest degradation? In *Realising REDD+: National Strategy and Policy Options*; Angelsen, A., Brockhaus, M., Eds.; Center for International Forestry Research: Bogor, Indonesia, 2009; pp. 213–221.
4. Angelsen, A. REDD+ as Result-based Aid. General Lessons and Bilateral Agreements of Norway. *Rev. Dev. Econ.* **2017**, *21*, 237–264. [CrossRef]
5. Wunder, S.; Engel, S.; Pagiola, S. Taking stock. A comparative analysis of payments for environmental services programs in developed and developing countries. *Ecol. Econ.* **2008**, *65*, 834–852. [CrossRef]
6. Samii, C.; Lisiecki, M.; Kulkarni, P.; Paler, L.; Chavis, L. Effects of Payment for Environmental Services (PES) on Deforestation and Poverty in Low and Middle-Income Countries: A Systematic Review. *Campbell Syst. Rev.* **2014**. [CrossRef]
7. Wunder, S. *Payments for Environmental Services—Some Nuts and Bolts*; Occasional Paper; CIFOR: Bogor, Indonesia, 2005.
8. Pattanayak, S.; Wunder, S.; Ferraro, P. Show Me the Money. Do Payments Supply Environmental Services in Developing Countries? *Rev. Environ. Econ. Policy* **2010**, *4*, 254–274. [CrossRef]
9. Karsenty, A.; Ongolo, S. Can "fragile states" decide to reduce their deforestation? The inappropriate use of the theory of incentives with respect to the REDD mechanism. *For. Policy Econ.* **2012**, *18*, 38–45. [CrossRef]
10. Brockhaus, M.; di Gregorio, M. National REDD+ policy networks. From cooperation to conflict. *Ecol. Soc.* **2014**, *19*, 14. [CrossRef]
11. Di Gregorio, M.; Brockhaus, M.; Cronin, T.; Muharrom, E.; Mardiah, S.; Santoso, L. Deadlock or Transformational Change? Exploring Public Discourse on REDD+ Across Seven Countries. *Glob. Environ. Politics* **2015**, *15*, 63–84. [CrossRef]

12. Vijge, M.J.; Brockhaus, M.; di Gregorio, M.; Muharrom, E. Framing national REDD+ benefits, monitoring, governance and finance. A comparative analysis of seven countries. *Glob. Environ. Chang.* **2016**, *39*, 57–68. [CrossRef]
13. Brockhaus, M.; Korhonen-Kurki, K.; Sehring, J.; di Gregorio, M.; Assembe-Mvondo, S.; Babon, A.; Bekele, M.; Gebara, M.F.; Khatri, D.B.; Kambire, H.; et al. REDD+, transformational change and the promise of performance-based payments. A qualitative comparative analysis. *Clim. Policy* **2016**, *17*, 708–730. [CrossRef]
14. Loft, L.; Pham, T.T.; Wong, G.Y.; Brockhaus, M.; Le, D.N.; Tjajadi, J.S.; Luttrell, C. Risks to REDD+. Potential pitfalls for policy design and implementation. *Environ. Conserv.* **2017**, *44*, 44–55. [CrossRef]
15. Di Gregorio, M.; Gallemore, C.T.; Brockhaus, M.; Fatorelli, L.; Muharrom, E. How institutions and beliefs affect environmental discourse. Evidence from an eight-country survey on REDD+. *Glob. Environ. Chang.* **2017**, *45*, 133–150. [CrossRef]
16. Korhonen-Kurki, K.; Brockhaus, M.; Sehring, J.; di Gregorio, M.; Assembe-Mvondo, S.; Babon, A.; Bekele, M.; Benn, V.; Gebara, M.F.; Kambire, H.; et al. What drives policy change for REDD+? A qualitative comparative analysis of the interplay between institutional and policy arena factors. *Clim. Policy* **2018**, *73*, 1–14. [CrossRef]
17. Gallemore, C.; Di Gregorio, M.; Moeliono, M.; Brockhaus, M. Transaction costs, power, and multi-level forest governance in Indonesia. *Ecol. Econ.* **2015**, *114*, 168–179. [CrossRef]
18. Sunderlin, W.D.; Sills, E.O.; Duchelle, A.E.; Ekaputri, A.D.; Kweka, D.; Toniolo, M.A.; Ball, S.; Doggart, N.; Pratama, C.D.; Padilla, J.T.; et al. REDD+ at a critical juncture. Assessing the limits of polycentric governance for achieving climate change mitigation. *Int. For. Rev.* **2015**, *17*, 400–413. [CrossRef]
19. Gallemore, C. Transaction costs in the evolution of transnational polycentric governance. *Int. Environ. Agreem.* **2017**, *17*, 639–654. [CrossRef]
20. Rodriguez-Ward, D.; Larson, A.M.; Ruesta, H.G. Top-down, Bottom-up and Sideways. The Multilayered Complexities of Multi-level Actors Shaping Forest Governance and REDD+ Arrangements in Madre de Dios, Peru. *Environ. Manag.* **2018**, *62*, 98–116. [CrossRef] [PubMed]
21. Dunlop, T.; Corbera, E. Incentivizing REDD+. How developing countries are laying the groundwork for benefit-sharing. *Environ. Sci. Policy* **2016**, *63*, 44–54. [CrossRef]
22. Ochieng, R.M.; Arts, B.; Brockhaus, M.; Visseren-Hamakers, I.J. Institutionalization of REDD+ MRV in Indonesia, Peru, and Tanzania. Progress and implications. *Ecol. Soc.* **2018**, *23*, 8. [CrossRef]
23. Hrabanski, M.; Bidaud, C.; le Coq, J.; Méral, P. Environmental NGOs, policy entrepreneurs of market-based instruments for ecosystem services? A comparison of Costa Rica, Madagascar and France. *For. Policy Econ.* **2013**, *37*, 124–132. [CrossRef]
24. Le Coq, J.; Froger, G.; Pesche, D.; Legrand, T.; Saenz, F. Understanding the governance of the Payment for Environmental Services Programme in Costa Rica. A policy process perspective. *Ecosyst. Serv.* **2015**, *16*, 253–265. [CrossRef]
25. Pasgaard, M. Lost in translation? How project actors shape REDD+ policy and outcomes in Cambodia. *Asia Pac. Viewp.* **2015**, *56*, 111–127. [CrossRef]
26. Asiyanbi, A.; Arhin, A.; Isyaku, U. REDD+ in West Africa. Politics of Design and Implementation in Ghana and Nigeria. *Forests* **2017**, *8*, 78. [CrossRef]
27. Wibowo, A.; Giessen, L. Absolute and relative power gains among state agencies in forest-related land use politics. The Ministry of Forestry and its competitors in the REDD+ Programme and the One Map Policy in Indonesia. *Land Use Policy* **2015**, *49*, 131–141. [CrossRef]
28. McGregor, A.; Challies, E.; Howson, P.; Astuti, R.; Dixon, R.; Haalboom, B.; Gavin, M.; Tacconi, L.; Afiff, S. Beyond Carbon, More Than Forest? REDD+ Governmentality in Indonesia. *Environ. Plan. A* **2015**, *47*, 138–155. [CrossRef]
29. Rosa da Conceição, H.; Börner, J.; Wunder, S. Why were upscaled incentive programs for forest conservation adopted? Comparing policy choices in Brazil, Ecuador, and Peru. *Ecosyst. Serv.* **2015**, *16*, 243–252. [CrossRef]
30. Corbera, E.; Soberanis, C.G.; Brown, K. Institutional dimensions of Payments for Ecosystem Services. An analysis of Mexico's carbon forestry programme. *Ecol. Econ.* **2009**, *68*, 743–761. [CrossRef]
31. Vatn, A. An institutional analysis of payments for environmental services. *Ecol. Econ.* **2010**, *69*, 1245–1252. [CrossRef]
32. Hausknost, D.; Grima, N.; Singh, S.J. The political dimensions of Payments for Ecosystem Services (PES). Cascade or stairway? *Ecol. Econ.* **2017**, *131*, 109–118. [CrossRef]

33. Ostrom, E. Institutional Rational Choice. In *Theories of the Policy Process*; Paul, S., Ed.; Westview Press: Boulder, CO, USA, 2007.
34. Howlett, M. Governance Modes, Policy Regimes and Operational Plans. A Multi-Level Nested Model of Policy Instrument Choice and Policy Design. *Policy Sci.* **2009**, *42*, 73–89. [CrossRef]
35. Baumol, W.; Oates, W. *The Theory of Environmental Policy*; Cambridge University Press: Cambridge, UK, 1988.
36. Keohane, N.; Revesz, R.; Stavins, R. The Choice of Regulatory Instruments in Environmental Policy. *Harv. Environ. Law Rev.* **1998**, *22*, 313–367.
37. Aidt, T. Political Internalization of Economic Externalities and Environmental Policy. *J. Public Econ.* **1998**, *69*, 1–16. [CrossRef]
38. Lipsky, M. *Street-Level Bureaucracy. Dilemmas of the Individual in Public Services—30th Anniversary Expanded Edition*; Russel Sage Foundation: New York, NY, USA, 2010.
39. Kingdon, J. *Agendas, Alternatives, and Public Policies*; Little, Brown: Boston, MA, USA, 1984.
40. Webber, D. Analyzing Political Feasibility. Political Scientists' Unique Contribution to Policy Analysis. *Policy Stud. J.* **1986**, *14*, 545–553. [CrossRef]
41. Linder, S.; Peters, G. Instruments of Government. Perceptions and Contexts. *J. Public Policy* **1989**, *9*, 35–58. [CrossRef]
42. Dan Wood, B.; Waterman, R.W. *Bureaucratic Dynamics. The Role of Bureaucracy in a Democracy*; Westview Press: Boulder, CO, USA, 1994.
43. Cox, G.; McCubbins, M. The Institutional Determinants of Economic Policy Outcomes. In *Structure and Policy in Presidential Democracies*; Haggard, S., McCubbins, M., Eds.; Cambridge University Press: New York, NY, USA, 2001.
44. Rose, R. What Is Lesson-Drawing? *J. Public Policy* **1991**, *11*, 3–30. [CrossRef]
45. Dolowitz, D.; Marsh, D. Learning from Abroad. The Role of Policy Transfer in Contemporary Policy-Making. *Governance* **2000**, *13*, 5–24. [CrossRef]
46. Wunder, S.; Brouwer, R.; Engel, S.; Ezzine-de-Blas, D.; Muradian, R.; Pascual, U.; Pinto, R. From principles to practice in paying for nature's services. *Nat. Sustain.* **2018**, *1*, 145–150. [CrossRef]
47. Wunder, S. The efficiency of payments for environmental services in tropical conservation. *Conserv. Boil.* **2007**, *21*, 48–58. [CrossRef] [PubMed]
48. Engel, S.; Pagiola, S.; Wunder, S. Designing payments for environmental services in theory and practice. An overview of the issues. *Ecol. Econ.* **2008**, *65*, 663–674. [CrossRef]
49. Honey-Rosés, J.; López-García, J.; Rendón-Salinas, E.; Peralta-Higuera, A.; Galindo-Leal, C. To pay or not to pay? Monitoring performance and enforcing conditionality when paying for forest conservation in Mexico. *Environ. Conserv.* **2009**, *36*, 120–128. [CrossRef]
50. Ferraro, P.; Pattanayak, S. Money for nothing? A call for empirical evaluation of biodiversity conservation investments. *PLoS Boil.* **2006**, *4*, e105. [CrossRef] [PubMed]
51. Engel, S. The Devil in the Detail—A Practical Guide on Designing Payments for Environmental Services. *IRERE* **2016**, *9*, 131–177. [CrossRef]
52. Pagiola, S.; Arcenas, A.; Platais, G. Can Payments for Environmental Services Help Reduce Poverty? An Exploration of the Issues and the Evidence to Date from Latin America. *World Dev.* **2005**, *33*, 237–253. [CrossRef]
53. Wunder, S. Payments for environmental services and the poor: Concepts and preliminary evidence. *Environ. Dev. Econ.* **2008**, *13*, 279–297. [CrossRef]
54. Grieg-Gran, M.; Porras, I.; Wunder, S. How Can Market Mechanisms for Forest Environmental Services Help the Poor? Preliminary Lessons from Latin America. *World Dev.* **2005**, *33*, 1511–1527. [CrossRef]
55. Wünscher, T.; Engel, S.; Wunder, S. Spatial targeting of payments for environmental services. A tool for boosting conservation benefits. *Ecol. Econ.* **2008**, *65*, 822–833. [CrossRef]
56. Alix-Garcia, J.; Janvry, A.D.; Sadoulet, E. The role of deforestation risk and calibrated compensation in designing payments for environmental services. *Environ. Dev. Econ.* **2008**, *13*, 375–394. [CrossRef]
57. Chen, X.; Lupi, F.; Vina, A.; He, G.; Liu, J. Using cost-effective targeting to enhance the efficiency of conservation investments in payments for ecosystem services. *Conserv. Boil.* **2010**, *24*, 1469–1478. [CrossRef] [PubMed]
58. Wätzold, F.; Dreschler, M. Spatially Uniform versus Spatially Heterogeneous Compensation Payments for Biodiversity-Enhancing Land-Use Measures. *Environ. Resour. Econ.* **2005**, *31*, 73–93. [CrossRef]

59. Ferraro, P.J. Asymmetric information and contract design for payments for environmental services. *Ecol. Econ.* **2008**, *65*, 810–821. [CrossRef]
60. Ferraro, P.; Kiss, A. Direct Payments to Conserve Biodiversity. *Science* **2002**, *298*, 1718–1719. [CrossRef] [PubMed]
61. Ferraro, P. Global Habitat Protection. Limitations of Development Interventions and a Role for Conservation Performance Payments. *Conserv. Biol.* **2001**, *15*, 990–1000. [CrossRef]
62. Ferraro, P.; Simpson, R.D. The Cost-Effectiveness of Conservation Payments. *Land Econ.* **2002**, *78*, 339–353. [CrossRef]
63. MAE (Ministerio del Ambiente). *Reporte de Gestión del Monitoreo de Cobertura Vegetal del Programa Socio Bosque*; MAE Ministerio del Ambiente: Quito, Ecuador, 2015.
64. MAE (Ministerio del Ambiente). *Línea Base de Deforestación del Ecuador Continental*; Ministerio del Ambiente: Quito, Ecuador, 2012.
65. MINAM (Ministerio del Ambiente). *Directiva No. 001-2017-MINAM/VMDERN/PNCB—Suscripción, Ratificación, Supensión, Resolución y Liquidación de Convenios para la Conservación de Bosques*; MINAM: Lima, Peru, 2017.
66. Acosta, A.; Araujo, M.C.; Perez-Liñan, A.; Saiegh, S. Jugadores de veto, instituciones volubles y politicas de baja calidad: El juego politico en Ecuador. In *El Juego Político en América Latina: ¿Cómo se Deciden las Políticas Públicas?* Scartascini, C., Spiller, P., Stein, E., Tommasi, M., Eds.; BID: Bogotá, Colombia, 2010.
67. Andrade, P. *Unfinished Business: State-Building and Large-Scale Mining under the Citizen's Revolution in Ecuador*; ENGOV Working Paper Series; ENGOV: Quito, Ecuador, 2013.
68. Melendez, C.; Leon, C. Perú 2009—Los Legados del Autoritarismo. *Rev. De Cienc. Política* **2010**, *30*, 451–477. [CrossRef]
69. Muradian, R.; Arsel, M.; Pellegrini, L.; Adaman, F.; Aguilar, B.; Agarwal, B.; Corbera, E.; Ezzine de Blas, D.; Farley, J.; Froger, G.; et al. Payments for ecosystem services and the fatal attraction of win-win solutions. *Conserv. Lett.* **2013**, *6*, 274–279. [CrossRef]
70. Pascual, U.; Phelps, J.; Garmendia, E.; Brown, K.; Corbera, E.; Martin, A.; Gomez-Baggethun, E.; Muradian, R. Social Equity Matters in Payments for Ecosystem Services. *BioScience* **2014**, *64*, 1027–1036. [CrossRef]
71. Greiner, R.; Stanley, O. More than money for conservation. Exploring social co-benefits from PES schemes. *Land Use Policy* **2013**, *31*, 4–10. [CrossRef]
72. de Koning, F.; Aguiñaga, M.; Bravo, M.; Chiu, M.; Lascano, M.; Lozada, T.; Suarez, L. Bridging the gap between forest conservation and poverty alleviation. The Ecuadorian Socio Bosque program. *Environ. Sci. Policy* **2011**, *14*, 531–542. [CrossRef]
73. Fehse, J. *Private Conservation Agreements Support Climate Action: Ecuador's Socio Bosque programme (Inside Stories on Climate Compatible Development)*; CDKN: Cape Town, South Africa, 2012.
74. Krause, T.; Collen, W.; Nicholas, K. Evaluating safeguards in a conservation incentive program. Participation, consent, and benefit sharing in indigenous communities of the Ecuadorian Amazon. *Ecol. Soc.* **2013**, *18*, 1. [CrossRef]
75. Seligson, M. The Rise of Populism and the Left in Latin America. *J. Democr.* **2007**, *18*, 81–95. [CrossRef]
76. Remmer, K. The Rise of Leftist- Populist Governance in Latin America. The Roots of Electoral Change. *Comp. Political Stud.* **2012**, *45*, 947–972. [CrossRef]
77. Hunter, W.; Power, T. Rewarding Lula. Executive Power, Social Policy, and the Brazilian Elections of 2006. *Lat. Am. Politics Soc.* **2007**, *49*, 1–30. [CrossRef]
78. Layton, M.; Smith, A.E. Incorporating Marginal Citizens and Voters. The Conditional Electoral Effects of Targeted Social Assistance in Latin America. *Comp. Political Stud.* **2015**, *48*, 854–881. [CrossRef]
79. Sewall, R. Conditional Cash Transfer Programs in Latin America. *SAIS Rev. Int. Aff.* **2008**, *28*, 175–187. [CrossRef]
80. Zucco, C. When Payouts Pay off. Conditional Cash Transfers and Voting Behavior in Brazil 2002–10. *Am. J. Political Sci.* **2013**, *57*, 810–822. [CrossRef]
81. Baud, M.; de Castro, F.; Hogenboom, B. Environmental Governance in Latin America. Towards an Integrative Research Agenda. *Eur. Rev. Lat. Am. Caribb. Stud.* **2011**, *90*, 79–88. [CrossRef]
82. Confederação Nacional da Indústria (CNI). *Pesquisa CNI-IBOPE: Retratos da Sociedade Brasileira: Meio Ambiente*; CNI: Brasília, Brazil, 2012.
83. IPSOS. *Perspectivas Electorales y Preocupaciones Ciudadanas*; IPSOS: Lima, Peru, 2014.

84. Wünscher, T.; Engel, S. International payments for biodiversity services. Review and evaluation of conservation targeting approaches. *Boil. Conserv.* **2012**, *152*, 222–230. [CrossRef]
85. Mohebalian, P.; Aguilar, F. Additionality and design of forest conservation programs: Insights from Ecuador's Socio Bosque Program. *For. Policy Econ.* **2016**, *71*, 103–114. [CrossRef]
86. MAE (Ministerio del Ambiente). *Manual Operativo Unificado 2012 Proyecto Socio Bosque*; Ministerio del Ambiente: Quito, Ecuador, 2012.
87. Holland, M.; de Koning, F.; Morales, M.; Naughton-Treves, L.; Robinson, B.; Suárez, L. Complex Tenure and Deforestation. Implications for Conservation Incentives in the Ecuadorian Amazon. *World Dev.* **2014**, *55*, 21–36. [CrossRef]
88. MINAM (Ministerio del Ambiente). *Manual de Operaciones del Programa Nacional de Conservación de Bosques para la Mitigación del Cambio Climático*; MINAM: Lima, Peru, 2013.
89. Persson, M.; Alpízar, F. Conditional Cash Transfers and Payments for Environmental Services—A Conceptual Framework for Explaining and Judging Differences in Outcomes. *World Dev.* **2013**, *43*, 124–137. [CrossRef]
90. Alix-Garcia, J.M.; Sims, K.R.E.; Yañez-Pagans, P. Only One Tree from Each Seed? Environmental Effectiveness and Poverty Alleviation in Mexico's Payments for Ecosystem Services Program. *Am. Econ. J. Econ. Policy* **2015**, *7*, 1–40. [CrossRef]
91. Profafor, S.A.; GIZ. *Diseño de un Proyecto REDD+ en Comunas Kichwas de la Amazonia Ecuatoriana*; Serie Sistematización No. 8; GIZ: Quito, Ecuador, 2013.
92. Bremer, L.L.; Farley, K.A.; Lopez-Carr, D. What factors influence participation in payment for ecosystem services programs? An evaluation of Ecuador's SocioPáramo program. *Land Use Policy* **2014**, *36*, 122–133. [CrossRef]
93. Jones, K.W.; Holland, M.B.; Naughton-Treves, L.; Morales, M.; Suarez, L.; Keenan, K. Forest conservation incentives and deforestation in the Ecuadorian Amazon. *Environ. Conserv.* **2016**. [CrossRef]
94. Ezzine-de-Blas, D.; Wunder, S.; Ruiz-Pérez, M.; Moreno-Sanchez, R.D. Global Patterns in the Implementation of Payments for Environmental Services. *PLoS ONE* **2016**, *11*, e0149847. [CrossRef] [PubMed]
95. Krause, T.; Loft, L. Benefit Distribution and Equity in Ecuador's Socio Bosque Program. *Soc. Nat. Resour.* **2013**, *26*, 1170–1184. [CrossRef]
96. Ministerio del Ambiente (MAE). *Manual Operativo del Proyecto Socio Bosque*; MAE: Quito, Ecuador, 2009.
97. Ministerio del Ambiente (MAE). *Acuerdo Ministerial No 130*; MAE: Quito, Ecuador, 2011.
98. Lambin, E.; Meyfroidt, P.; Rueda, X.; Blackman, A.; Börner, J.; Cerutti, P.; Dietsch, T.; Jungmann, L.; Lamarque, P.; Lister, J.; et al. Effectiveness and synergies of policy instruments for land use governance in tropical regions. *Glob. Environ. Chang.* **2014**, *28*, 129–140. [CrossRef]
99. Simpson, R.D.; Sedjo, R. Paying for the conservation of endangered ecosystems. A comparison of direct and indirect approaches. *Environ. Dev. Econ.* **1996**, *1*, 241–257. [CrossRef]
100. Collen, W.; Krause, T.; Mundaca, L.; Nicholas, K.A. Building local institutions for national conservation programs: Lessons for developing Reducing Emissions from Deforestation and Forest Degradation (REDD+) programs. *Ecol. Soc.* **2016**, *21*, 4. [CrossRef]
101. Cuenca, P.; Robalino, J.; Arriagada, R.; Echeverría, C. Are government incentives effective for avoided deforestation in the tropical Andean forest? *PLoS ONE* **2018**, *13*, e0203545. [CrossRef] [PubMed]
102. Börner, J.; Wunder, S.; Giudice, R. Will up-scaled forest conservation incentives in the Peruvian Amazon produce cost-effective and equitable outcomes? *Environ. Conserv.* **2016**, *43*, 407–416. [CrossRef]
103. Euler, M. *Efectos Socio-Económicos de las Transferencias Directas Condicionadas en las Comunidades Nativas Beneficiarias del Programa Bosques*; GIZ: Lima, Peru, 2016.
104. Ochieng, R.M.; Visseren-Hamakers, I.J.; Brockhaus, M.; Kowler, L.F.; Herold, M.; Arts, B. Historical development of institutional arrangements for forest monitoring and REDD + MRV in Peru. Discursive-institutionalist perspectives. *For. Policy Econ.* **2016**, *71*, 52–59. [CrossRef]
105. Robiglio, V.; Armas, A.D.; Silva Aguad, C.; White, D. Beyond REDD+ readiness. Land-use governance to reduce deforestation in Peru. *Clim. Policy* **2014**, *14*, 734–747. [CrossRef]
106. Jespersen, K.; Gallemore, C. "The Institutional Work of Payments for Ecosystem Services: Why the Mundane Should Matter". *Ecol. Econ.* **2018**, *146*, 507–519. [CrossRef]
107. Turnhout, E.; Gupta, A.; Weatherley-Singh, J.; Vijge, M.J.; de Koning, J.; Visseren-Hamakers, I.J.; Herold, M.; Lederer, M. Envisioning REDD+ in a post-Paris era. Between evolving expectations and current practice. *WIREs Clim. Chang.* **2017**. [CrossRef]

108. Lund, J.F.; Sungusia, E.; Mabele, M.B.; Scheba, A. Promising Change, Delivering Continuity. REDD+ as Conservation Fad. *World Dev.* **2017**, *89*, 124–139. [CrossRef]
109. Redford, K.H.; Padoch, C.; Sunderland, T. Fads, funding, and forgetting in three decades of conservation. *Conserv. Boil.* **2013**, *27*, 437–438. [CrossRef] [PubMed]

Trifecta of Success for Reducing Commodity-Driven Deforestation: Assessing the Intersection of REDD+ Programs, Jurisdictional Approaches, and Private Sector Commitments

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Received: 15 August 2018; Accepted: 29 September 2018; Published: 2 October 2018

Abstract: To date, numerous public- and private-sector efforts, commitments, and initiatives to reduce commodity-driven deforestation have emerged. In and of themselves, these elements—namely REDD+ programs, jurisdictional approaches (JAs), and private sector commitments—are necessary, but they are not sufficient to reduce deforestation. When operating together, however, these efforts have the potential to significantly reduce commodity-driven deforestation. This research aimed to determine whether and where REDD+ programs, JAs, and private sector commitments overlap in what are termed "trifecta jurisdictions". Considering that each element possesses features that can enhance and complement those of the others, the authors hypothesized that—but did not ascertain whether—trifecta jurisdictions present the greatest potential to reduce commodity-driven deforestation. A total of 13 trifecta jurisdictions and six bifecta jurisdictions—where two of the three elements are present—were identified by: compiling a dataset of REDD+ programs, JAs, and private sector commitments; evaluating all potential options against established criteria; and categorizing them according to trifecta or bifecta jurisdiction status. The fact that a majority of trifecta and bifecta jurisdictions are located in countries with the most tropical tree cover loss is also significant in that it highlights the presence of these elements where most needed, and how high deforestation rates might be attracting REDD+ program, JA, and private sector commitment activities. Although many of the REDD+ programs, JAs, and private sector commitments are relatively nascent and their ability to collectively reduce deforestation is not yet clearly evident, this article posited that synergistic potential is greatest in trifecta and bifecta jurisdictions and that efforts should be made to greater align these elements.

Keywords: REDD+; jurisdictional approaches; private sector commitments; commodity-driven deforestation; trifecta jurisdictions; supply chains; public-private partnerships

1. Introduction

In the lead-up to 2020—a year that marks the deadline for many companies to meet the deforestation and sustainability goals to which they have committed—it is critical for key government and private-sector entities to begin implementing solutions that will prove most effective for combating deforestation resulting from the production of key commodities like soy, cattle, timber and pulp, palm oil, and cocoa [1,2]. Commercial agriculture in tropical forest countries is known to be the driver of 40% of deforestation and continues to be a driving force of large-scale deforestation [3,4]. In fact, tree cover loss in the tropics has been rising steadily over the past 17 years. According to recent Global Forest Watch data, 2017 was the second-worst year on record for tropical forest loss; the tropics

alone experienced 15.8 million hectares of tree cover loss that year, an area the size of Bangladesh [5]. Historically, the private sector has approached solving deforestation one supply chain at a time. In light of evident limitations of certification systems (such as the Roundtable on Sustainable Palm Oil and the Forest Stewardship Council) and other approaches that have been used to reduce commodity-driven deforestation, the adoption and evolution of REDD+ as a government driven process leading to results-based payments has begun facilitating the shift of focus away from supply chain-specific approaches, and toward the development and implementation of jurisdictional approaches (JAs) [6,7]. JAs, which will be discussed further in Section 2.3, are integrated, multi-stakeholder planning initiatives at the landscape level that are aligned with subnational or national political jurisdictions to facilitate sustainable economic development and advance environmental commitments to reducing commodity-driven deforestation [8]. A trend seems to be emerging in which government, the private sector, non-governmental organization (NGO) actors, and other stakeholders involved with tackling commodity-driven deforestation are increasingly exploring JAs as potential avenues to overcome the shortcomings of discrete approaches to curb deforestation [9].

Jurisdictional approaches, alongside REDD+ programs and private sector commitments, number among the most promising tools to eliminate commodity-driven deforestation. It should be noted that, while some believe that JAs represent a combined form of REDD+ programs and private sector commitments, in this analysis each of these elements is distinct, as described below:

- **REDD+ programs**: These programs are governed at the provincial or national jurisdictional (not project) levels, focus on results-based payments for verified carbon sequestration, emphasize public policy, and address deforestation generally (not just commodity-deforestation).
- **Jurisdictional approaches**: JAs focus more on the role of public-private partnerships for reducing commodity-driven deforestation and avoiding economic and deforestation leakages.
- **Private sector commitments**: These pledges are made in various forms—such as zero deforestation commitments and certification standards—by individual companies to reduce deforestation in their supply chains.

Facing mounting pressure to broadly and effectively reduce commodity-driven deforestation, governments and companies alike are striving to identify the most promising solutions. Given that in and of themselves, these elements are not sufficient to reduce commodity-driven deforestation at scale, REDD+ programs, JAs, and private sector commitments need to operate in conjunction to significantly reduce commodity-driven deforestation; each element has the potential to support, complement, and enhance the others to ensure their medium to long term success [10,11]. Pursuing this line of thinking, this paper explores the questions: How many current REDD+ programs (subnational and above), JA initiatives, and private sector commitments overlap in the same jurisdictions? How can these jurisdictions be characterized? This article hypothesizes that efforts to reduce and eliminate commodity-driven deforestation at a landscape level will be most successful in jurisdictions where all three elements—REDD+ programs, JAs, and private sector commitments—are in place; these jurisdictions are referred to as "trifecta jurisdictions" (Figure 1).

This article begins with providing an overview of the linkages between REDD+ and commodity-driven deforestation, the successes and limitations of private sector approaches to reduce commodity-driven deforestation, and the characteristics of JAs. The next section describes the methodology of the analysis, followed by a discussion of the findings. More detailed descriptions of the REDD+ programs, JAs, and private sector commitments analyzed in this article can be found in the supplementary materials. The concluding section provides insights into the relevance of the results and how they can be used to advance action to reduce commodity-driven deforestation in key jurisdictions.

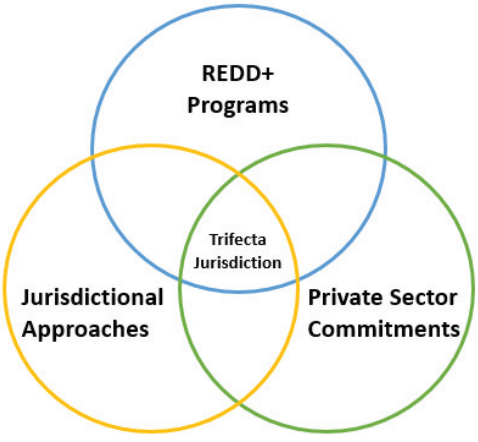

Figure 1. Elements of a trifecta jurisdiction.

2. Background

2.1. REDD+ Programs

The linkage between commodity production and deforestation began before REDD+ was formally introduced in the United Nations Framework Convention on Climate Change (UNFCCC) negotiation process in 2005 [12]. Previous to the entrance of what is now jurisdictional REDD+ into the UNFCCC process, project level REDD+ started as early as 1997 with the Noel Kempf Mercado Climate Action project in Bolivia [13]. Initial thoughts about applying REDD+ as a tool to address deforestation in supply chains revolved around disagreement at the global level over two questions posed by developing countries: (1) Why should they not be allowed to clear forest for development purposes, when a portion of forest clearing was done to plant commodities to meet growing demand from global supply chains? (2) And if they were not going to clear forest, who was going to compensate them for the opportunity cost? [14].

After eight years, UNFCCC negotiations on REDD+ culminated in the Warsaw Framework for REDD+ (WFR). The WFR provides an overarching framework and methodological guidance for REDD+ implementation and payment for results at the federal level. Because of concerns about deforestation leakage from smaller project type REDD+ into neighboring areas—such as soy-related deforestation leakage from the Brazilian Amazon biome to the Cerrado biome for example—UNFCCC negotiators at COP16 defined the scale of REDD+ to be at the national level and only subnational level in the interim [15]. The jurisdictional or government-level scale of the WFR ensures that REDD+ programs are the focus of national strategies, rather than an amalgamation of distinct projects. The WFR requires that National REDD+ Strategies describe how the drivers of deforestation will be addressed and encourages all countries, organizations, and the private sector to take action to reduce the drivers [16]. However, no explicit type of demand-side actions to address the drivers are required of developed countries or of consumers of deforestation driving commodities [16].

To better tackle the specific and unique nature of commodity-driven deforestation, many initiatives are now exploring how to link REDD+ programs to other initiatives to reduce commodity-driven deforestation. For example, many multilateral REDD+ programs, such as the Forest Carbon Partnership Facility (FCPF), Forest Investment Program (FIP), and the UN-REDD Program, created to help countries prepare for and implement REDD+, have supported efforts to address the commodity drivers of deforestation in REDD+ countries [17–19]. Additionally, platforms like the Tropical Forest Alliance 2020 (TFA 2020), Consumer Goods Forum (CGF), and New York Declaration on Forests (NYDF) came to the fore to help catalyze linkages between public and private sector actors seeking to reduce

deforestation [1,2,20]. Finally, the Norwegian International Climate and Forest Initiative (NICFI)—one of the major REDD+ donors—supported several NGOs to study "Commodity Supply Chain Initiatives of Relevance to REDD+" between 2013 and 2015 [21].

Although REDD+ programs are demonstrating progress, REDD+ is still considered to be "a great idea, but hardly tried" by many [22,23]. The need to comply with stringent donor or government criteria has delayed the implementation of REDD+ programs, as has the ability to overcome vested interests related to business-as-usual [22,24]. REDD+ programs must also tackle other difficult governance challenges that accompany improving land tenure and benefit distribution, which can be complicated by local circumstances [25]. Lastly, the ability of REDD+ to effectively address the underlying drivers of deforestation can be hindered by the unique and specific nature of deforestation drivers, and the broad reach of potential trade impacts that such actions might have [26].

2.2. Private Sector Commodity Supply Chain Initiatives

As of June 2018, 473 companies globally have committed to curbing deforestation in supply chains linked to palm oil, soy, timber and pulp, and cattle [27]. Such commitments have taken various forms, including targets related to purchasing certified products, supply chain traceability, moratoria on areas or suppliers linked to deforestation, certification schemes and sectoral standards, and other goals to improve sustainable management or reduce deforestation. The surge in private sector commitments is helping elevate the importance of forests, forge linkages between key stakeholders throughout supply chains, and focus attention on key deforestation drivers [28]. The certification approach, in particular, including the Forest Stewardship Council (FSC), Roundtable on Sustainable Palm Oil (RSPO), and the Soy Moratorium, continues to serve as a primary tool of many private sector commitments and has demonstrated mild success in curbing deforestation by setting a precedent for achieving traceability, producing responsibly, and establishing important platforms to discuss and determine best management practices [29–31].

Despite these benefits, there is no clear evidence that these private sector initiatives are having their intended impacts. The many shortcomings, specifically of certification systems, have become particularly evident [32]. Various socio-economic and environmental limitations such as economic leakage, low and selective adoption, poor forest governance, minimal market uptake, high expenses for small holders, lack of government buy in, and unintended social consequences all undermine the potential of private interventions to aggregate towards meeting broader aspirational goals to reduce commodity-driven deforestation [6]. Moreover, limited geographical coverage induces geographical leakage effects, while the focus on specific commodities does not allow for a comprehensive approach to land use changes and precludes potential indirect feedback effects [6]. Additionally, continued demand for conventional cheaper commodities might undermine supply chain action. Regarding certification systems, the limitations of this approach have also become more apparent. For example, despite the rapid expansion of FSC certification, evidence suggests that the certification system has had very little positive impact on deforestation [33]. The success of RSPO, on the other hand, has been challenged by lax implementation and weak commitments to sustainable palm oil production [34]. The Soy Moratorium's success has also been questioned due to potential leakage of soy-related deforestation from the Amazon biome to the Cerrado Biome [35]. Overall, there are myriad uncoordinated corporate initiatives with different objectives, measures, and timelines whose implementation is hardly monitored [6]. The effectiveness of such a highly fragmented approach to halting deforestation is questionable at the very least.

2.3. Jurisdictional Approaches

As noted, there are various public and private platforms, programs, and initiatives that have ushered in a wave of commitments to halt deforestation. However, the lack of coordinated and integrated strategies has made it challenging to meet demands for agricultural products without further deforestation and economic leakage. While individual company, NGO, and government

actions have helped pave the way towards curbing commodity-driven deforestation, lasting and significant progress will likely require implementation at scale through jurisdictional-level planning and cooperation among key stakeholders [36].

The JA aims to do just that by aligning and coordinating the conservation, supply chain sustainability, and green development interests and actions of various stakeholders within a jurisdiction—a country or a politically defined area (such as a state or province) with defined governance [37]. The JA is a more inclusive and comprehensive solution than project- or supply chain-specific strategies that focuses on tackling deforestation from all angles. This government-led, multi-stakeholder process, which includes companies, producers, purchasers, civil society, local communities, and other local stakeholders, facilitates deforestation reduction across entire landscapes [9]. The JA focus on government is fundamental to the success of this strategy. Recognizing the value and importance of government involvement and action at scale, companies are beginning to consider JAs in order to meet their supply chain sustainability commitments.

By engaging key public and private actors, JAs combine strong governance and policy interventions with supply chain efforts aimed at reducing commodity-driven deforestation [32]. Through aligning multistakeholder goals, JAs present opportunities for these actors to work together in public-private partnerships to address issues that could undermine supply chain efforts aimed at tackling deforestation such as leakage, which means deforestation problems are simply shifted to other places, commodities, or ecosystems [32]. Furthermore, the results generated by JAs can easily be linked to results-based payments for REDD+, and can benefit from finance for phases 1 (readiness) and 2 (implementation) of REDD+. The scalability of JAs, and knowledge and experience sharing that accompanies collaboration at scale, helps ensure widespread and potentially long-term impacts.

Despite the potential of JAs to contribute to efforts to reduce deforestation, there are several challenges that could hinder their success. In order for JAs to be effective, strong governance needs to be in place at the appropriate scale [36]. Additionally, not only do all stakeholders involved need to coordinate and align their goals and efforts, they also need to be inclusive of all potential actors that could impact or be impacted by JA performance, such as those involved with REDD+ programs [38]. Another potential issue is that, by operating at a jurisdictional scale, recognition of good actors and identification of non-compliant actors—who may simply shift operations outside of the jurisdiction in question so as to continue deforesting—may be challenging.

3. Trifecta Jurisdiction Analysis Methodology

As demonstrated in the previous section, REDD+ programs, JAs, and private sector commitments face many challenges. When combined in trifecta jurisdictions, however, these challenges can be overcome, and the synergies between the three elements can facilitate more effective and lasting commodity-driven deforestation reduction (Figure 2). To answer the questions underpinning this analysis—where do REDD+ programs, JA, and private sector initiatives overlap in the same jurisdiction, and how can these trifecta jurisdictions be characterized—the trifecta jurisdiction analysis methodology was developed.

The first step of the methodology entailed creating several criteria to ascertain which REDD+ programs, JAs, and private sector commitments qualified for analysis. Then a comprehensive data set of all potential REDD+ programs, JAs, and private sector commitments to be taken into consideration was compiled. These initiatives were then assessed and categorized according to the established criteria to determine which would be eligible for analysis. Finally, eligible REDD+ programs, JAs, and private sector commitments were organized by jurisdiction to determine whether and where these initiatives overlapped in trifecta jurisdictions (Table S1) or bifecta jurisdictions (Table S2), and to identify which areas might be of interest for deeper analysis; more detail about the REDD+ program, JA, and private sector commitment initiatives included in this analysis can be found in the supplementary material.

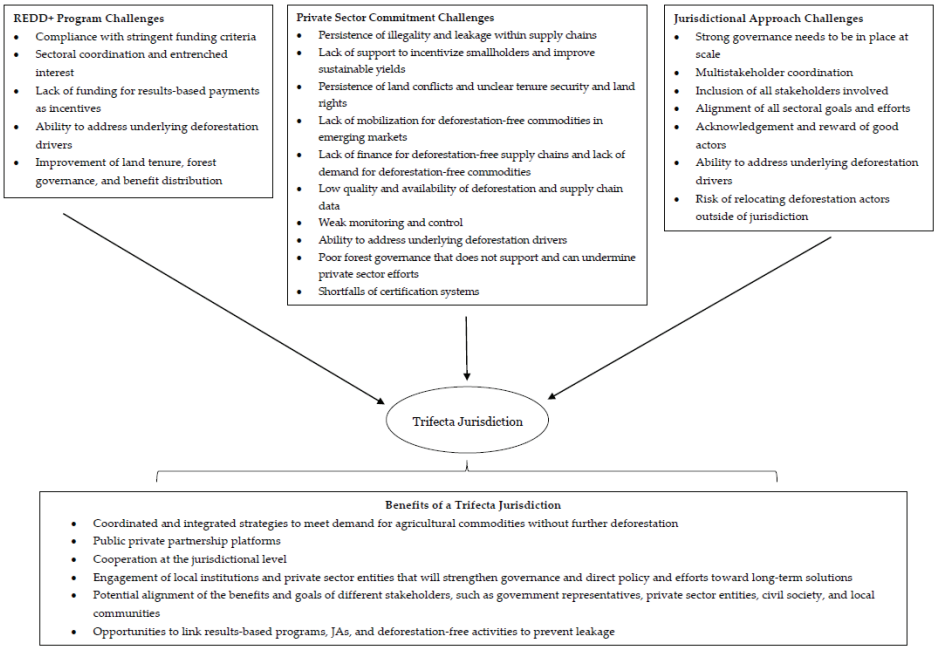

Figure 2. Element-specific challenges that can be overcome through collaboration in trifecta jurisdictions and the benefits such alignment can yield.

3.1. Criteria for the Selection of REDD+ Programs

Four different criteria were used to determine which national and subnational REDD+ programs were eligible for this analysis. The first criterion reflected whether a country had a UN-REDD national program in place, the second whether a country had made significant progress in multilateral programs such as the FCPF, and the third whether a country had submitted a forest reference emission level/forest reference level (FREL/FRL) to the UNFCCC's Lima Info Hub [23]. These three criteria reflect how far along REDD+ implementation is in various countries. A REDD+ program was deemed eligible for analysis if two of the first three criteria mentioned were met. The fourth criterion reflected whether a subnational jurisdiction is engaged in bilateral REDD+ program agreements, such as the German Development Bank's (KfW) REDD+ Early Movers (REM) Program; those that are were also considered eligible [39].

3.2. Criteria for the Selection of Jurisdictional Approaches

As the JA concept continues gaining traction, more and more initiatives at the jurisdictional scale are being developed. To be included in this analysis, jurisdictional approaches needed to prioritize government leadership and involvement. In other words, subnational or national governments had to be involved in the JA from its inception, and continue to play a key role throughout implementation. The second criterion was that a JA needed to revolve around reducing deforestation resulting from the production of one or several of the key commodities of focus: soy, cattle, cocoa, palm oil, or timber and pulp. These commodities were selected due to their impact on deforestation. Lastly, there needed to be documented action or progress demonstrating that each JA was underway.

3.3. Criteria for the Selection of Private Sector Commitments

Although many companies have made commitments to reduce or eliminate deforestation from their supply chains, for this analysis, corporate commitments were only considered if they met three criteria. The first criterion required that company commitments, strategies, or announcements indicating an intent to reduce deforestation, create sustainable supply chains, or source responsibly be published in a publicly accessible way. Second, corporate commitments needed to be tied to one of the key commodities. The last selection criterion referred to information on the geographical location of the action. A simple statement that the action was intended, but without information on where the action was occurring, was not considered sufficient.

4. Results

4.1. Trifecta Jurisdictions

According to the trifecta analysis, there are a total of 13 trifecta jurisdictions in which all three elements are in place (Table 1). Of those, 12 are at the country level, while one is at the subnational level. Five of the jurisdictions are located in Latin America, six in Africa, and two in Southeast Asia. When comparing trifecta jurisdictions to a list of the top 30 tropical forest countries with the most tree cover loss from 2001 to 2016 (Table A1), 11 of the trifecta jurisdictions are in the top 30. The top five countries on the list (Brazil, Indonesia, Democratic Republic of the Congo, Malaysia, and Paraguay in order) are all trifecta jurisdictions; if Mato Grosso were a country, it would have been ranked fourth on the list. This is an important finding, because it indicates that coordinated efforts are occurring where there is significant deforestation. The fact that trifecta jurisdictions are located in areas with the most tree cover loss could also mean that high deforestation is attracting REDD+ program, JA, and private sector commitment action. This does not indicate, however, the degree to which these elements are aligned; further analysis is needed to ascertain the extent of coordination, as explained in the discussion section.

Table 1. All trifecta jurisdictions, including commodities of focus and geographies of interest.

Trifecta Jurisdiction	Cattle	Soy	Palm Oil	Cocoa	Pulp-Timber	Geographies of Interest
Brazil	✔	✔				Amazon and Cerrado biomes [1]
Colombia	✔	✔	✔	✔		Orinoquia
Côte d'Ivoire			✔	✔	✔	Southwest and Tai Regions
Democratic Republic of the Congo	✔		✔	✔	✔	Mai Ndombe
Dominican Republic				✔		Country
Gabon			✔			Country
Ghana			✔	✔		Brong-Ahafo and Western Region
Indonesia			✔	✔		Sumatra, Riau, West Papua, and Kalimantan
Malaysia			✔			Sabah
Mato Grosso, Brazil	✔	✔				Mato Grosso
Nigeria			✔			Country
Paraguay	✔	✔				Atlantic Forest region
Republic of Congo			✔	✔		Country
Total	5	5	9	7	2	–

[1] Although the Amazon and Cerrado biomes include Mato Grosso, the state is treated as an individual jurisdiction because of progress specific to Mato Grosso.

In terms of commodities, of the 13 trifecta jurisdictions, nine include explicit private sector commitments or JAs with a focus on palm oil, and are underway across the world. Cattle, the largest source of commodity-driven deforestation and one that is traded less globally comparatively, is being addressed in five jurisdictions (two of which overlap in the Brazilian Amazon biome, which extends into Mato Grosso) [40]. Soy efforts are also focused in Latin America, where there are four jurisdictions of note (two in Brazil, one in Paraguay, and one in Colombia). Cocoa was also a focus in seven jurisdictions (four in Africa, one in Asia, and two in Latin America). Of note is that key commodities are being tackled by JAs and private sector initiatives underway in the five countries experiencing the most forest cover loss. Palm oil is the focus in Indonesia, the Democratic Republic of the Congo,

and Malaysia; cattle and soy in Brazil and Paraguay; and timber and pulp in the Democratic Republic of the Congo and Côte d'Ivoire.

4.2. Bifecta Jurisdictions

Those jurisdictions in which two of the three elements are present are known as bifecta jurisdictions (See Table 2). Of the six bifecta jurisdictions identified in this analysis, one is subnational and five are national. REDD+ and JA initiatives are underway in all six of the bifecta jurisdictions. There are no geographically specific private sector commitments present in any of the bifecta jurisdictions, however.

Table 2. All bifecta jurisdictions, including commodities of focus and geographies of interest [1].

Bifecta Jurisdiction	Cattle	Soy	Palm Oil	Cocoa	Geographies of Interest
Acre, Brazil	✔				Acre
Ecuador	✔		✔	✔	Country
Mexico	✔		✔		Country
Nepal	✔				Terai Arc Landscape
Peru	✔		✔	✔	Pachitea Basin, San Martin, and Ucayali
Zambia		✔			Eastern Valley
Total	5	1	3	2	–

[1] As stated above, all bifecta jurisdictions listed have a REDD+ program and JA in place, but lack geographically specific private sector commitments.

Considering the relevance of the bifecta jurisdictions in the list of top 30 countries with forest cover loss from 2001 to 2016, five of the six bifecta jurisdictions are represented; Nepal was the only country that did not make the list. If the Brazilian state of Acre were a country, the sub-national jurisdiction would have ranked 26th on the list. Regarding commodities driving deforestation, cattle was a focus in five of the jurisdictions (Ecuador, Mexico, Nepal, Peru, and Acre), with palm following in three of the jurisdictions (Ecuador, Mexico, and Peru). Soy (Zambia) and cocoa (Peru and Ecuador) were also covered to lesser extents.

5. Discussion

The trifecta jurisdiction concept is nascent, considering that implementation of many REDD+ programs, JAs, and private sector commitments has only just begun. As such, at this stage it is difficult to determine the extent to which these elements are aligning; this analysis aimed to determine where the three elements are occurring so as to flag areas of interest and importance, but did not set out to ascertain the extent or nature of any alignment. Further clarity about the potential success of trifecta jurisdictions is essential, however, considering the limitations of each distinct trifecta jurisdiction element. Analyzing the production of export commodities, the extent of deforestation due to the volume of commodity production, and the presence of large corporates active in export production in trifecta jurisdictions could shed light on how the elements are aligning and the potential impact of this alignment.

Our results indicate that of the 19 trifecta and bifecta jurisdictions, 16 of the countries represented are found in the top 30 tree cover loss list. More interestingly, trifecta jurisdictions are located in the top five tree cover loss countries. These results reinforce our assumption that much of the REDD+ program, JA, and/or private sector work is occurring in areas where deforestation is most prevalent and that, therefore, there is a need to continue encouraging public and private entities to work together to tackle commodity-driven deforestation. An area that demonstrates the potential of trifecta jurisdictions to curb commodity-driven deforestation is Mato Grosso, Brazil (a trifecta jurisdiction); see Box 1 for a more in-depth explanation of what is occurring in this trifecta jurisdiction. Although this article posits that trifecta jurisdictions are the most likely to succeed in reducing, and eventually eliminating, commodity-driven deforestation, future analysis is needed to determine the validity of this hypothesis.

Box 1. A description of the trifecta elements in Mato Grosso, Brazil.

Box 1: Mato Grosso, Brazil—A Trifecta Jurisdiction

Mato Grosso, Brazil is one of the jurisdictions where a REDD+ program, a JA, and pri-vate sector commitments overlap; in other words, Mato Grosso is a trifecta jurisdiction. With regards to REDD+, in addition to adhering to the national REDD+ strategy and FREL data that the Brazilian government submitted to the UNFCCC REDD+ platform, the Mato Grosso state government passed a law to create a state REDD+ system in 2013 [41,42]. Additionally, Mato Grosso signed a results-based payment agreement with the REM pro-gram in 2017 [43]. Mato Grosso has also been a pioneer when it comes to JAs. In 2015, the governor of Mato Grosso launched the Produce, Conserve, Include strategy (PCI), a state government-led multistakeholder strategy that aims to keep 6 $GtCO_2$ emissions from forests out of the at-mosphere by 2030 [44]. To contribute to climate change mitigation and adaptation, the PCI aims to restore 6 million ha of degraded pastures, reduce deforestation by 90%, increase agricultural production, and include smallholders and indigenous communities. Many private sector entities have been active in the PCI. Companies such as Amaggi, Lou-is-Dreyfus, and JBS, support Mato Grosso's PCI strategy through engaging in sustainable sourcing agreements, supporting the development of technical capacity, promoting sus-tainable practices to increase productivity, and providing conservation and financial bene-fits to ranchers. Amaggi, for example, has been actively working with the PCI governance entities to develop a strategic forest restoration plan for Mato Grosso that is in line with both state and private sector goals [45].

Compared to the neighboring state of Pará, which faces similar drivers of deforesta-tion and had a similar deforestation trend, Mato Grosso seems to have gained traction in reducing deforestation while increasing agricultural production. Using 2015 as a starting point for when the PCI, private sector commitments, and REDD+ programs were all in place—or when the trifecta elements were all in effect—it is evident that Mato Grosso has realized a reduction in its annual deforestation rate by 2.5% (deforestation rates totaled 2153 km^2 in 2015, and decreased to 1561 km^2 in 2017), while deforestation rates in the neighboring state of Pará jumped from 2153 km^2 in 2015 to 2433 km^2 in 2017; an increase of about 13% (Figure A1) [46]. While too early to state that the difference in deforestation reduction performance between Mato Grosso and Pará equates to proof that trifecta juris-dictions are more successful in terms of reducing commodity-driven deforestation, it does show a promising trend toward a greater decrease of deforestation in one of the trifecta jurisdictions identified as likely to perform in the future.

Data demonstrating the collective impacts of these elements on commodity-driven defor-estation in trifecta jurisdictions is also limited at this stage. Although it is difficult to pinpoint how much of a role the synergies between trifecta elements have contributed to or could contrib-ute to commodity-driven deforestation reduction, in areas where private governance systems coordinate and integrate efforts with public governance and involve all local stakeholders within the jurisdiction, the likelihood of decreasing deforestation at a large scale is greater. Findings from Heilmayr and Lambin support our hypothesis and indicate that governance regimes with greater collaboration between environmental and industry stakeholders can achieve better environmen-tal outcomes [47].

6. Conclusions

The purpose of this analysis was to determine whether and where REDD+ program, JA, and private sector initiatives overlap in trifecta and bifecta jurisdictions, and to discuss what potential impact this overlap could have on reducing commodity-driven deforestation at a broad scale. The underlying hypothesis driving this analysis is that, because REDD+ program, JA, and private sector efforts each possess features that can enhance and complement those of the other initiatives, jurisdictions with all three elements in place will perform the best at reducing commodity-driven deforestation over the medium to long term. More analysis will be needed in the future, however, to determine the extent to which this hypothesis is valid. Additionally, analyses could be done on how different initiatives complement each other so as to understand the intricate dynamics of this collaboration, and to identify any other elements that might need to be in place to further catalyze performance. Such analyses would be invaluable in the areas of interest—trifecta and bifecta jurisdictions—flagged in this article.

This analysis identified 13 jurisdictions where all three of the initiatives believed to be essential in combating commodity-driven deforestation are underway. By identifying where these "trifecta

jurisdictions" are located, this analysis has highlighted those areas we hypothesize to have the most potential for effectively curbing commodity-driven deforestation. Although it is too early to tell how these jurisdictions are performing in terms of reducing commodity-driven deforestation, monitoring whether the alignment of the trifecta elements is having an impact will be helpful in determining the most effective strategies for reducing commodity-driven deforestation.

As time passes, and more action is taken to curb commodity-driven deforestation, the trifecta elements will continue catalyzing and complementing one another. Private sector actors, government members, NGOs, producers, traditional communities, and other local stakeholders need to realize that reducing commodity-driven deforestation requires collaboration across sectors and at a broad scale. Trifecta jurisdictions could facilitate that coordination. By determining where REDD+ programs, JAs, and private sector commitments are overlapping and discussing the potential significance of this alignment, this article aims to further discussions regarding how to most effectively and efficiently reduce commodity-driven deforestation.

Author Contributions: Conceptualization, C.M., B.L. and P.U.; Methodology, C.M., B.L. and P.U.; Data curation B.L., J.C., P.U. and C.M.; Formal Analysis, C.M., B.L. and P.U.; Writing-Original Draft Preparation, C.M., B.L. and P.U.; Writing-Review & Editing, B.L., C.M., P.U.; Visualization, B.L., C.M., P.U. and J.C.

Funding: This research was supported by Norway's International Climate and Forest Initiative (NICFI).

Appendix A

Table A1. Top 30 countries with the most tropical forest loss between 2001 and 2016.

Country	Ranking	Trifecta	Bifecta
Brazil	1	✔	
Indonesia	2	✔	
Democratic Republic of the Congo	3	✔	
Brazil_Mato Grosso	4	✔	
Malaysia	4	✔	
Paraguay	5	✔	
Bolivia	6		
Colombia	7	✔	
Mexico	8		✔
Myanmar	9		
Madagascar	10		
Mozambique	11		
Peru	12		✔
Laos	13		
Angola	14		
Vietnam	15		
Côte d'Ivoire	16	✔	
Tanzania	17		
Venezuela	18		
Thailand	19		
India	20		
Zambia	21		✔
Papua New Guinea	22		
Brazil_Acre	22		✔
Cameroon	23		
Ghana	24	✔	
Ecuador	25		✔
Central African Republic	26		
Republic of Congo	27	✔	
Nigeria	28	✔	
Gabon	29	✔	
Ethiopia	30		

Source: Global Forest Watch [46].

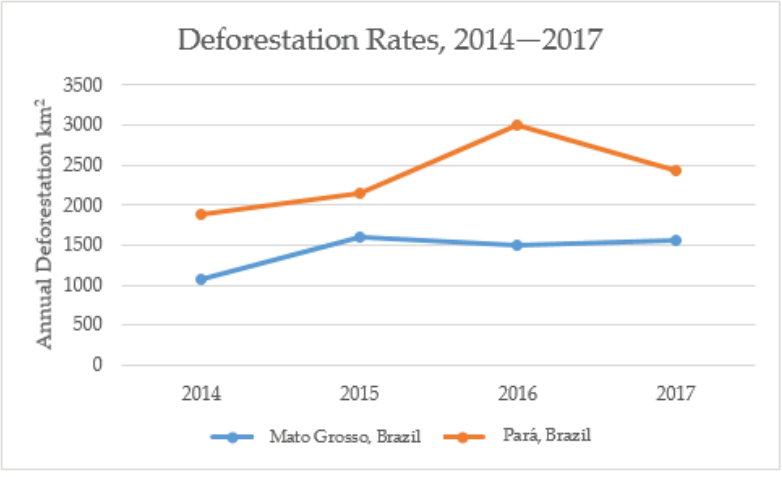

Figure A1. Deforestation rates for Mato Grosso and Pará, Brazil between 2014 and 2017.

References

1. United Nations Climate Summit. New York Declaration on Forests—Action Agenda. Available online: https://nydfglobalplatform.org/wp-content/uploads/2017/10/NYDF_Action-Agenda.pdf (accessed on 11 September 2018).
2. The Consumer Goods Forum. Deforestation. Available online: https://www.theconsumergoodsforum.com/initiatives/environmental-sustainability/key-projects/deforestation/ (accessed on 11 September 2018).
3. Seymour, F. Deforestation is Accelerating, Despite Mounting Efforts to Protect Tropical Forests. What Are We Doing Wrong? Available online: https://blog.globalforestwatch.org/data/deforestation-is-accelerating-despite-mounting-efforts-to-protect-tropical-forests-what-are-we-doing-wrong (accessed on 10 August 2018).
4. Hosonuma, N.; Herold, M.; De Sy, V.; De Fries, R.S.; Brockhaus, M.; Verchot, L.; Angelsen, A.; Romijn, E. An assessment of deforestation and forest degradation drivers in developing countries. *Environ. Res. Lett.* **2012**, *7*, 4009. [CrossRef]
5. Weisse, M.; Goldman, E.D. 2017 Was the Second-Worst Year on Record for Tropical Tree Cover Loss. Available online: http://www.wri.org/blog/2018/06/2017-was-second-worst-year-record-tropical-tree-cover-loss (accessed on 10 August 2018).
6. Lambin, E.; Gibbs, H.; Heilmayr, R.; Carlson, K.; Fleck, L.; Garrett, R.; de Waroux, Y.; McDermott, C.; McLaughlin, D.; Newton, P.; et al. The role of supply-chain initiatives in reducing deforestation. *Nat. Clim. Chang.* **2018**, *8*, 109–116. [CrossRef]
7. AlphaBeta. Supporting Jurisdictional Leadership in Net Zero Deforestation through Sustainable Value Chains: Opportunities for TFA 2020. Available online: https://www.tfa2020.org/wp-content/uploads/2017/04/TFA2020-Supporting-jurisdictional-leadership-in-net-zero-deforestation-Report.pdf. (accessed on 9 September 2018).
8. Wang, M. A Closer Look at Jurisdictional Approaches. Available online: https://www.tfa2020.org/en/closer-look-jurisdictional-approaches/ (accessed on 7 September 2018).
9. Wolosin, M. Jurisdictional Approaches to Zero Deforestation Commodities. Available online: http://d2ouvy59p0dg6k.cloudfront.net/downloads/wwf_jurisdictional_approaches_to_zdcs_nov_2016.pdf (accessed on 13 August 2018).
10. Bernstein, S.; Cashore, B. Complex global governance and domestic policies: Four pathways of influence. *Int. Aff.* **2012**, *88*, 585–604. [CrossRef]
11. Newton, P.; Agrawal, A.; Wollenberg, L. Enhancing the sustainability of commodity supply chains in tropical forest and agricultural landscapes. *Glob. Environ. Chang.* **2013**, *23*, 1761–1772. [CrossRef]
12. Pearce, D.; Barbier, E. *Blueprint for a Sustainable Economy*; Earthscan Publications Ltd.: London, UK, 2000; ISBN 1 85383 515 3.

13. Holloway, V.; Giandomenico, E. The History of REDD Policy. Available online: https://redd.unfccc.int/uploads/2_164_redd_20091216_carbon_planet_the_history_of_redd_carbon_planet.pdf (accessed on 21 September 2018).
14. Ingalls, M.L.; Meyfroidt, P.; To, P.X.; Kenney-Lazar, M.; Epprecht, M. The transboundary displacement of deforestation under REDD+: Problematic intersections between the trade of forest-risk commodities and land grabbing in the Mekong region. *Glob. Environ. Chang.* **2018**, *50*, 255–267. [CrossRef]
15. Noojipady, P.; Morton, D.C.; Macedo, M.N.; Victoria, D.C.; Huang, C.; Gibbs, H.K.; Bolfe, E.L. Forest carbon emissions from cropland expansion in the Brazilian Cerrado biome. *Environ. Res. Lett.* **2017**, *12*, 2. [CrossRef]
16. United Nations Framework Convention on Climate Change. Addressing the Drivers of Deforestation and Forest Degradation. Available online: https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=43 (accessed on 21 September 2018).
17. Forest Carbon Partnership Facility. Forest Carbon Partnership Facility. Available online: https://www.forestcarbonpartnership.org/sites/fcp/files/2017/Sep/FCPF_Annual2017_web.pdf (accessed on 9 September 2018).
18. Climate Investment Funds. FIP Operations and Results Report. Available online: https://www.climateinvestmentfunds.org/sites/cif_enc/files/fip_19_3_orr_1.pdf (accessed on 9 September 2018).
19. UN-REDD Programme Fund. 9th Consolidated Annual Progress Report of the UN-REDD Programme Fund. 2018. Available online: https://unredd.net/documents/programme-progress-reports-785/2017-programme-progress-reports/16895-ninth-consolidated-annual-progress-report-of-the-un-redd-programme-fund-low-resolution.html (accessed on 1 October 2018).
20. Tropical Forest Alliance 2020. Objectives. Available online: https://www.tfa2020.org/en/about-tfa/objectives/ (accessed on 9 September 2018).
21. Norwegian Climate and Forest Initiative (NICFI). Norad/Climate and Forest Initiative Funding Scheme for Civil Society 2013–2015: Guide to the Thematic Priority Areas. Available online: https://www.norad.no/globalassets/import-2162015-80434-am/www.norad.no-ny/filarkiv/3.-sivsa-2012---/cfi/guide-to-thematic-areas.pdf (accessed on 9 September 2018).
22. Seymour, F.; Busch, J. *Why Forests? Why Now?* Brookings Institution Press: Washington, DC, USA, 2016; ISBN 978-1-933286-85-3.
23. United Nations Framework Convention on Climate Change. Lima REDD+ Information Hub. Available online: https://redd.unfccc.int/info-hub.html (accessed on 11 September 2018).
24. Brockhaus, M.; Korhonen-Kurki, K.; Sehring, J.; Di Gregorio, M.; Assembe-Mvondo, S.; Babon, A.; Bekele, M.; Gebara, M.F.; Khatri, D.B.; Kambire, H.; et al. REDD+ transformational change and the promise of performance-based payments: A qualitative comparative analysis. *Clim. Policy* **2017**, *17*, 708–730. [CrossRef]
25. Jodoin, S. *Forest Preservation in a Changing Climate: REDD+ and Indigenous and Community Rights in Indonesia and Tanzania*; Cambridge University Press: Cambridge, UK, 2017; ISBN 978-107-18900-3.
26. La Viña, A.G.M.; de Leon, A. Two Global Challenges, One Solution: International Cooperation to Combat Climate Change and Tropical Deforestation. Available online: https://www.cgdev.org/sites/default/files/CGD-Climate-Forest-Paper-Series-14-LaVina-DeLeon-International-Cooperation_0.pdf (accessed on 10 August 2018).
27. Haupt., F.; Bakhtary, H.; Schulte, I.; Galt, H.; Streck, C. Progress on Corporate Commitments and their Implementation. Available online: http://www.tfa2020.org/wp-content/uploads/2018/06/Progress-on-Corporate-Commitments-and-their-Implementation.pdf (accessed on 26 June 2018).
28. Chagas, T.; Streck, C.; Galt, H.; Zwick, S.; Schulte, I.; Kroeger, A.; Thompson, A. Impacts of Supply Chain Commitments on the Forest Frontier. Available online: https://www.tfa2020.org/wp-content/uploads/2018/06/Impacts-of-Supply-Chain-Commitments-on-the-Forest-Frontier.pdf (accessed on 6 June 2018).
29. Forest Stewardship Council. Available online: https://us.fsc.org/en-us (accessed on 10 September 2018).
30. Roundtable on Sustainable Palm Oil (RSPO). Available online: https://rspo.org/ (accessed on 10 September 2018).
31. Andario, P. The Soy Moratorium, 10 years on: How One Commitment is Stopping Amazon Destruction. Available online: https://www.greenpeace.org/archive-international/en/news/Blogs/makingwaves/the-soy-moratorium-10-year-anniversary-stopping-amazon-destruction/blog/57127/ (accessed on 10 September 2018).

32. Haupt, F.; Streck, C.; Bakhtary, H.; Behm, K.; Kroeger, A.; Schulte, I. Zero-Deforestation Commodity Supply Chains by 2020: Are We on Track? Available online: https://climatefocus.com/sites/default/files/20180123%20Supply%20Chain%20Efforts%20-%20Are%20We%20On%20Track.pdf.pdf (accessed on 10 August 2018).
33. Panlasigui, S.; Rico-Straffon, J.; Swenson, J.; Loucks, C.J.; Pfaff, A. Early Days in the Certification of Logging Concessions: Estimating FSC's Deforestation Impact in Peru & Cameroon. Available online: http://sites.nicholasinstitute.duke.edu/environmentaleconomics/files/2015/08/WP-EE-15-05-FULL-PDF.pdf (accessed on 13 August 2018).
34. Shah, V. Amnesty International Finds Human Rights Abuses in Wilmar Supply Chain. Available online: http://www.eco-business.com/news/amnesty-international-finds-human-rights-abuses-in-wilmar-supply-chain/ (accessed on 13 August 2018).
35. Gibbs, H.K.; Rausch, L.; Munger, J.; Schelly, I.; Morton, D.C.; Noojipady, P.; Soares-Filho, P.; Barreto, P.; Walker, N.F. Brazil's soy moratorium. *Science* **2015**, *347*, 377–378. [CrossRef] [PubMed]
36. Meyer, C.; Lujan, B. Local government must lead at jurisdictional levels. *Eur. Trop. For. Res. Netw.* **2017**, *58*, 214–219.
37. Fishman, A.; Oliveira, E.; Gamble, L. Tackling Deforestation through a Jurisdictional Approach: Lessons from the Field. Available online: https://c402277.ssl.cf1.rackcdn.com/publications/1146/files/original/wwf_ja_brasilia_final_exec_sum_w_cover.pdf?1520454599 (accessed on 13 August 2018).
38. Meyer, C.; Miller, D. Zero deforestation zones: The case for linking deforestation-free supply chain initiatives and jurisdictional REDD+. *J. Sustain. For.* **2015**, *36*, 559–580. [CrossRef]
39. REDD Early Movers—Tools and Instruments. Available online: https://www.giz.de/en/worldwide/33356.html (accessed on 1 October 2018).
40. Anair, D.; Mahmassani, A. Cattle, Cleared Forests, and Climate Change: Scoring America's Top Brands on Their Deforestation-Free Beef Commitments and Practices. Available online: https://www.ucsusa.org/sites/default/files/attach/2016/09/ucs-cattle-cleared-forests-climate-change-2016.pdf (accessed on 13 August 2018).
41. United Nations Framework Convention on Climate Change. REDD+ Web Platform, Lima Info Hub, Brazil Country Overview. Available online: https://redd.unfccc.int/submissions.html?country=bra (accessed on 21 September 2018).
42. Legislação Estadual-Mato Grosso. Criar o Sistema Estadual de Redução de Emissões por Desmatamento e Degradação Florestal, Conservação, Manejo Florestal Sustentável e Aumento dos Estoques de Carbono Florestal—REDD+ no Estado de Mato Grosso e dá outras providências. Available online: https://www.legisweb.com.br/legislacao/?id=249723 (accessed on 21 September 2018).
43. Forest Trends, Ecosystem Marketplace. Big REDD Week for Two Brazilian States. Available online: https://www.forest-trends.org/ecosystem_marketplace/big-redd-week-for-two-brazilian-states/ (accessed on 21 September 2018).
44. Produzir, Conservar, Incluir. Available online: http://pci.mt.gov.br/ (accessed on 1 October 2018).
45. Estratégia Produzir, Conservar, e Incluir (PCI) em Mato Grosso. Bases Para o Monitoramento Das Metas. Governo de Mato Grosso. Available online: https://produceprotectplatform.com/img/matogrosso/docs/Bases%20para%20o%20Monitoramento%20das%20Metas%20da%20PCI_BR-EN.pdf (accessed on 21 September 2018).
46. Global Forest Watch. Available online: https://www.globalforestwatch.org/ (accessed on 21 September 2018).
47. Heilmayr, R.; Lambin, E.F. Impacts of nonstate, market-driven governance on Chilean forests. *Proc. Natl. Acad. Sci. USA* **2016**, *113*, 2910–2915. [CrossRef] [PubMed]

How REDD+ Is Performing Communities

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Received: 22 August 2018; Accepted: 5 October 2018; Published: 12 October 2018

Abstract: Community based approaches are becoming the norm in environmental governance initiatives. One prominent example of this is Reduced Emissions from Deforestation and forest Degradation (REDD+), a climate change mitigation strategy that aims at reducing carbon emissions caused by deforestation and forest degradation in developing countries. REDD+ policies generally evoke communities as both potential beneficiaries of REDD+ and as agents for its implementation. However, it is unclear what REDD+ policies are really referring to when they talk about communities. Drawing on critical social science literature about the idea of community, this article advances a performative perspective to analyze how communities are articulated in international and national REDD+ policy, and reflects on the potential implications of these articulations. Results reveal that international policy documents, including those of the major non-governmental organizations (NGOs) engaged in REDD+, tend to present an interpretation that corresponds to Agrawal and Gibson's myth of communities as small, localized, and homogenous social units that share social norms. On the other hand, national policy documents reveal enormous variety in the communities that are actually targeted in national REDD+ policies in terms of resources, governance structure, and social cohesion. One conclusion that could be drawn from this is that the dominant uniform interpretation of communities in REDD+ policy, and in much academic and NGO literature, is clearly unrealistic. However, this does not mean that it is inconsequential. We conclude our article by discussing the performative effects of the identified articulations of community.

Keywords: performativity; REDD+ policy; myths of community; forest governance; climate change

1. Introduction

The need to involve communities in the implementation of the international policy initiative on Reduced Emissions from Deforestation and forest Degradation (REDD+) is widely stressed in both policy and academic literature on the subject [1–8]. (Indeed, much of the literature that is critical of REDD+ bases its complaints on the failure to adequately involve communities in decision making, or to adequately reward them for their REDD+ efforts [9–11]. However, what is implied by the term 'community' (or 'local community', as it appears in the United Nations Framework Convention on Climate Change (UNFCCC) sources) is not discussed in any of these texts, which simply assume the presence of entities called 'communities' in or around forested areas. These communities are widely referred to in the context of REDD+ safeguards, i.e., the need to protect rights to use the forest and to receive social benefits (even poverty alleviation). However, they are also frequently portrayed as the stakeholders who will be responsible for management of local REDD+ initiatives.

In this paper, we explore how communities have been imagined in REDD+, and we examine what impact these framings may have had not only on the policy, but also on the communities themselves. We start by observing that the definition of 'community' was problematized very well twenty years

ago by Agrawal and Gibson [12], who observed that proponents of a community approach to natural resource management usually consider 'community' to mean a place-based, small, spatial social unit, with a homogeneous social structure and shared norms. They provided a historico-philosophical explanation for this perception and then criticized it claiming communities tend to be made up of different actor groups with varying interests, the implication being that 'shared norms' may be a myth. Despite this, such myths continue to be evoked by powerful external actors who propagate it to justify interventions based on problematic assumptions about community approaches being pro-poor, efficient because they incorporate local knowledge, and a fulcrum for democratic change amongst others [13,14]. However, while there has been vigorous debate on the issue of the efficacy of communities in managing natural resources [15–17], there has been relatively little debate on what 'community' actually means in the context of REDD+ specifically.

The notion that communities may be a central pillar in the implementation of REDD+ fundamentally rests on the idea that the rural population, or that part of it that has access to forest resources, is organized into communities which could in principle gear up to carry out activities under the REDD+ banner. This assumes that communities have a number of characteristics, for example leadership with local legitimacy and organizational mandate, as well as the skills needed (which could be bolstered through capacity building), although it is well recognized that community involvement in REDD+ may also require improving the security of land tenure [18–21]. It also seems to imply that where forests are inhabited, there is 'wall-to-wall' presence of communities. However, it may be questioned whether presence of human life necessarily implies presence of communities, in the sense that people consider themselves to be members of a particular place-based 'community' which can decide upon and undertake a series of actions, either communally or through coordination of individual effort. While this may well be true for some communities in some circumstances, it may be questioned whether the entire rural population, particularly in areas that are well integrated into the global economy, feels that it belongs to communities of this kind. Moreover, much human-used forest is very clearly not under any sort of control by communities. Global estimates of the proportion of forest land recognized as owned or managed by communities vary from 22% to 30% [22,23]; other forest areas may be used by the local rural population as an open access resource; often this is officially state or (large scale) private property.

Given the significance attributed to REDD+ as an integrated approach to climate adaptation and mitigation in developing countries [24], it is urgent to examine how communities are envisioned and articulated in REDD+, as well as the implications. We start by examining the role of communities as presented in official policy documents of the UNFCCC on REDD+, and in materials written by the international organizations providing support for REDD+. We then turn to the national documents on REDD+, analyzing in detail eight of the most recent and more advanced REDD+ country programs as submitted to the Forest Carbon Partnership Facility (FCPF) program of the World Bank for financing. This enables us to trace different meanings ascribed to the term 'community' in different contexts, which we believe is important to deepen understanding of how 'communities' can become engaged in REDD+. Before we present the findings, we first discuss our performative perspective and methodological approach.

2. Communities: A Performative Perspective

As discussed in the previous section, the idea of communities, defined as small spatial units with homogenous social structures and shared social norms, is problematic, and this can be viewed in at least two different dimensions. The first relates to representation, being the way in which ideals of community fail to represent the reality of communities. Agrawal and Gibson [12] highlight the ideological character of the idea of community and of the way in which communities are evoked in current natural resource management policies. Confronted with the failure of the state to conserve forests and nature, and the negative social consequences of many state-led policies, as well as piggy-backing on wider trends to participation and democratization, communities have emerged as an

attractive and appropriate target for policies. This reflects a belief that community involvement could "promote desirable collective decisions" thereby enhancing the effectiveness, as well as legitimacy of these policies [12] (p. 636). However, this community ideal falls short of capturing the reality of communities and particularly the diverse actors, interests, and norms that constitute them and Agrawal and Gibson suggest that this may result in disappointing effects of community based natural resource management policies. Specifically, it makes these policies vulnerable for elite capture and may result in them reproducing or even enhancing existing power inequalities [25]. Whilst much of the REDD+ academic literature, alongside much of the official REDD+ documentation, attaches great importance to communities, this last point is increasingly being recognized. Several recent contributions have highlighted risks of elite capture within communities, and the risk that the lion's share of benefits will go to those who by tradition or by circumstance have a greater share of the resources and power over community decision making [26–30].

This leads us to the second dimension of the problematic of communities, which relates to performativity. Quite apart from the question of whether policy discourses that evoke the myth of communities are realistic, it must be recognized that they are not innocent or inconsequential. As Igoe and Fortwangler [31] (p. 66) explain: "while these discourses may not accurately describe the realities of the problems that these interventions are meant to resolve, they are nevertheless effective for mobilizing significant revenues and extending state control over people and natural resources". This suggests that they are performative in the sense that they produce effects that cannot be understood with reference to their representational accuracy [32]. This argument has amongst others been applied to the process of nation building. Scott [33] (p. 3) explains that representational devices, such as maps, rework reality to fit with the ideal: "They did not successfully represent the actual activity of the society they depicted, nor were they intended to; they represented only that slice of it that interested the official observer. When allied with state power, they would enable much of the reality they depicted to be remade". Anderson's well-known book 'Imagined Communities' makes a similar point. To Anderson, Nation States can create their constituencies by presenting authoritative and attractive visions, in media, maps, or museums, which people can evoke and make their own [34].

However, as the many examples in Scott [33] show, this constitutive power of visions does not mean that these visions become reality exactly as imagined; they often create unintended effects and they can fail even on their own terms. Performativity means that there will inevitably be overflows [35], that is to say, unpredictable and contingent surprises [32,36]. Studies of participation and engagement using the concept of performativity have highlighted how identities and interests of participants do not pre-exist but are formed in the participatory practice, often with unintended and unpredictable outcomes [25,37]. Thus, a performative perspective on policy invites us to consider what policies do and how they produce effects. Importantly, this is not the same as asking how effective policies are. Instead of an evaluative perspective that judges the performance of policies using a yardstick, such as the stated objectives of a policy, or criteria for good governance, performativity is tied to a practice-based perspective [38,39] and does not assume the existence of yardsticks or policies outside the practices they judge or intervene in. This interpretation of performativity finds its roots in Science and Technology Studies [40,41], and recognizes that policies and their outcomes are entangled and that they are both constitutive of and constituted in practice. Applied to the notion of community, a performative perspective suggests that communities do not simply exist, passively waiting for REDD+ to engage them. Instead, REDD+ performs communities, it brings them into being in practice in specific, contingent, and context specific ways. According to Marres [42], this argument can be traced back to pragmatist philosophy and particularly to Dewey's 'The Public and its Problems' [43]. Marres [42] suggests that the formation of publics (communities in the case of REDD+) is not just about will formation (articulating the interests of the communities), but also issue formation (shaping the meaning of REDD+ and the problems it addresses).

In other words, a performative perspective offers insights into the workings of a policy, which go beyond evaluating its representational quality (does the policy adequately reflect reality) and its

effectiveness (does it achieve stated objectives) and allows for critical examination of the intended and unintended political implications of policy prescriptions. Consequently, this paper asks how REDD+ performs communities, that is, what visions of community do REDD+ policies at various levels articulate and with what potential consequences?

3. Method

To understand how communities are envisaged in the international policy on REDD+, we examined three sets of literature; Firstly, all the official policy decisions, as well as submissions made by parties and observers, which were made during the negotiations on REDD+. These are available on the UNFCCC website [44]. This represents a relatively concise body of centralized literature, which can readily be overseen. Secondly, literature from NGOs and support organizations, which in contrast is vast and widely dispersed. Although we could not make an exhaustive or all-inclusive study, we attempted to distil the main lines of discussion in this material in as far as they refer to communities in REDD+.

Thirdly, for the analysis of how communities are framed in national level REDD+ planning, we used as examples the eight countries which had submitted so-called Emissions Reduction Programs (ERPs) to the World Bank's Forest Carbon Partnership Facility (FCPF) in final or draft form by the time this study was carried out (end of 2017). These are the most complete expressions of the rationale of national REDD+ thinking available and can be compared since the reports follow a common format requiring among other things, the identification of stakeholders and an explanation of the causes of deforestation and degradation, as well as how the interventions planned are consistent with this. The countries that had submitted final ERPs at the time of this research were: Chile, Mexico, Vietnam, the Democratic Republic of Congo (DRC), and Costa Rica, whilst Ghana, Mozambique, and the Republic of Congo (R. Congo) had entered draft ERPs. In all cases, except for Costa Rica, these plans were not for the entire country, but for selected geographic areas only.

The ERPs were studied using the textual analysis software Atlas-ti. A full document search was made for all mentions of the word 'community' or 'communities' (including 'local communities' and 'indigenous communities'). Uses of terms that were irrelevant for our purposes (e.g., international community, donor community, plant community, and proper names) were ignored, as were those parts of the text that were provided by the World Bank (i.e., embedded in the format) and sections that were copies of standard texts from other sources, such as the UN Declaration on Rights of Indigenous Peoples. The reference lists at the end of the reports were also excluded from the analysis. The remaining uses of the term 'community' were coded using a set of alternative signifiers, which are explained in the results section of this paper. Words which could have similar meanings to 'community' (e.g., village, indigenous group, commune, agrarian nucleus) were also checked and compared. All the reports were in English, but where a version in an alternative language (e.g., French, Spanish) was available, the equivalent terms were also identified to ensure consistency.

4. Communities as Articulated in UNFCCC REDD+ Policy

The Paris Climate Agreement [45] includes in Article 5 explicit reference to 'policy approaches and positive incentives for activities relating to 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'. The initiative is generally known as REDD+. In this context, no direct mention of communities is included, though the preamble to the Agreement lists the need to consider obligations, such as support for the rights of indigenous peoples and of local communities, and Article [8], on adaptation, refers among other items to support for the resilience of communities. However, the need for engagement and participation of 'local communities' and 'indigenous peoples' (IPs) in various ways is clearly expressed in earlier UNFCCC policy decisions on REDD+. In these decisions, the term 'communities' is mentioned ten times, particularly in the context of recognizing their needs [1]. The documents specify it will be important that REDD+ ensures communities' sustainable livelihoods, develops safeguard information systems that show respect for

their rights and their knowledge, provides options for adaption to climate change which take into account their traditional and indigenous knowledge, and engages them in monitoring and reporting (Table 1). There is strong emphasis on consultation and the use of community knowledge to arrive at better REDD+ interventions, which, at minimum, will do no harm to their livelihoods. More recent decisions also recognize the potential of communities to be involved in the implementation of these interventions. The influence of IP lobby groups, which joined with civic environmental movements to form a front for issues relating to social justice during the climate change negotiations [46–48], is evident in the repeated use of the combo 'local communities and indigenous peoples' and undoubtedly served to increase the prominence of 'communities' in these policy texts.

The views of the UNFCCC negotiating Parties on the engagement of communities in REDD+ can also be traced through the submissions that have been entered on different topics throughout the process. What is most noticeable is that, as with the policy developments outlined above, there has been a progression in how the role of communities has been seen. Whilst the call for benefits to flow to communities has been present in broad and unspecific terms throughout the negotiation process, quite quickly contributions turned to focus on the need to engage communities in the generation of information (monitoring) of carbon stocks and of the effectiveness of REDD+ efforts locally. This was followed by calls for community monitoring of safeguards, including those that refer to respect for knowledge and rights of IPs and members of local communities, promotion and support for effective participation of communities (e.g., through Free, Prior and Informed Consent (FPIC)), and protection and conservation of natural forests, whilst enhancing social and environmental benefits considering the need for sustainable livelihoods. Although there have been sporadic references to direct incentive payments to communities (e.g., by Colombia, [49]), most refer to community benefits in general, without committing to cash payments as such, and the most recent submissions have focused on the need for non-carbon benefits to communities, possibly financed in addition to carbon. Overall, whilst there are clear calls for the participation of communities in the sense of providing information and receiving some benefits (and above all, not being disadvantaged by REDD+), there is no clear picture given in either the national submissions or in the UNFCCC policy texts on whether and how communities would be engaged in the actual implementation of REDD+ post planning phase, presumably in part because this would interfere with national sovereignty on the matter.

Additionally, is it noticeable that there is no definition at all in these policy texts of what 'community' means, barring one remark from COMIFAC (the Commission of Central African Forests) which suggests that the definition should be left to individual countries according to their national circumstances [50]. Clearly, social institutions vary greatly between countries and trying to impose a single definition would be impossible. However, it is apparent that the term is intended to refer to groups of people resident in or near forests who are dependent on these forests for part of their livelihoods, whether or not they have formal tenure, rather than to individuals who own forest land as private property. However, in reality many rural communities are made up of smallholders (operating essentially as private land owners) or at least include some quasi-private situations. Farmers within communities usually operate as individuals even where there is no formal tenure (i.e., usufructure systems are common). Therefore, whilst use of the term 'community' implies some kind of group or communal decision-making system, there is no implication in the texts that a community necessarily possesses and/or manages areas of communal land as this may or may not be the case; nor is any particular size of community or form of community governance suggested. The phrase 'local communities' as noted above is almost always paired with, but clearly seen as different from, 'indigenous peoples'. The latter term is well recognized, e.g., in the UN Declaration on the Rights of Indigenous Peoples in relation to territories owned by or claimed by groups who identify themselves as being of a specific local ethnicity, and it is safe to assume that the term 'local communities' is considered to have a broader, more catch-all meaning. To conclude, the UNFCCC does not provide a definition of communities but does envision them as being able to benefit from REDD+, and as potential agents in the planning, implementation, and monitoring of REDD+ without a clear specification of how exactly

the communities are to accomplish this. This formulation appears to have been chosen to ensure that REDD+ is directed at the poorer, more traditional, users of rural land and forests, rather than profiting large land owners. This was partly in response to concerns that arose (among others, from international NGOs and Indigenous Peoples' (IP) organizations, see below) when REDD+ was proposed, with a view to ensuring that REDD+ would be socially equitable. However, the formulation makes no reference to possible inequalities within communities and how individuals within communities would be engaged.

Table 1. References to communities and indigenous peoples in the United Nations Framework Convention on Climate Change (UNFCCC) decisions on Reduced Emissions from Deforestation and Forest Degradation (REDD+).

Decision	Paragraph	Text
Bali, 2007 FCCC 2/13	Preamble	*Recognizing* also that the needs **of local and indigenous communities** should be addressed when action is taken to reduce emissions from deforestation and forest degradation in developing countries;
Copenhagen, 2009 FCCC 4/15	Preamble	*Recognizing* the need for full and effective engagement of **indigenous peoples and local communities** in, and the potential contribution of their knowledge to, monitoring and reporting of activities relating to decision 1/CP.13, paragraph 1 (b) (iii);
	3	*Encourages*, as appropriate, the development of guidance for effective engagement of **indigenous peoples and local communities** in monitoring and reporting;
Cancun, 2010 FCCC 1/16	72	*Also requests* developing country Parties, when developing and implementing their national strategies or action plans, to address, inter alia, the drivers of deforestation and forest degradation, land tenure issues, forest governance issues, gender considerations and the safeguards identified in paragraph 2 of appendix I to this decision, ensuring the full and effective participation of relevant stakeholders, inter alia **indigenous peoples and local communities**;
	Appendix 1, para. 2c	(Safeguard 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;
	Appendix 1, para. 2d	(Safeguard D) The full and effective participation of relevant stakeholders, **in particular indigenous peoples and local communities**, in the actions referred to in paragraphs 70 and 72;
	Appendix 1	(Footnote to Safeguard D) Taking into account the need for sustainable livelihoods of **indigenous peoples and local communities** and their interdependence on forests in most countries, reflected in the United Nations Declaration on the Rights of Indigenous Peoples, as well as the International Mother Earth Day;
2011, Durban FCCC 5/17	Para. 1.3	*Further agrees* that enhanced action on adaptation should tak(e) into consideration vulnerable groups, **communities** and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional and indigenous knowledge;
2012, Doha FCCC 3/18	Para. 3.6 (f)	*Invites all Parties* to enhance action on addressing loss and damage associated with the adverse effects of climate change by undertaking, inter alia (f) Involving **vulnerable communities** and populations, and civil society, the private sector and other relevant stakeholders, in the assessment of and response to loss and damage;
2015, Paris FCCC15/21	Preamble, ToR for Doha WP review of Article 6 of the Convention	*Reaffirming* the importance of taking into account **indigenous peoples, local communities** and non-governmental organizations in activities related to Article 6 of the Convention.

5. Communities as Articulated by International Support Agencies and NGOs

The position of intergovernmental support organizations and NGOs on the role of communities in REDD+ is, in comparison to the UNFCCC and its Parties, much more detailed. In a formal submission to the UNFCCC [49], the UN Convention on Biological Diversity calls for the development

of self-sufficiency in REDD+ of indigenous and local communities. Similarly, the UN Forum on Forests calls for community forestry under REDD+, for the involvement of communities in meaningful decisions on state forests, and as one of the first, for attention to the role and importance of tenure. Crucially, a community approach to implementation appears to be at the heart of the UN REDD+ program (a support and funding program jointly managed by United Nations Development Programme, the Food and Agriculture Organization and the United Nations Environmental Programme, which has a specific community based sub-program co-financed by the Global Environmental Fund Small Grants Program. The World Bank's Forest Carbon Partnership Facility (FCPF), one of the major funders of REDD+, follows a charter which requires testing ways to sustain or enhance livelihoods of local communities and conserve biodiversity, whilst its Forest Investment Program (FIP) has a dedicated mechanism that provides grant funding for indigenous people and local communities to engage in the implementation of REDD+ processes. Conservation International states that the participation of indigenous peoples and local communities is crucial to the successful development and implementation of REDD+ mechanisms, and has developed a community manual to support such efforts [51]. However, perhaps more than any other agencies, the CGIAR organizations have been influential in shifting the nature of much discourse on REDD+ from its earlier focus on international results-based finance to national governments, to one in which the central issue is what communities can do at the local level. This can be seen in the work of the Centre for International Forestry Research (CIFOR), which championed the idea of the '3Es' (effectiveness, efficiency and equity) as the standard against which REDD+ implementation should be held [52], and followed this up with in its global comparative study and global database of community level REDD+ projects [53]. This type of thinking is also present in the work of The World Agroforestry Centre, ICRAF, with its Local Perspectives on REDD+ [54] and arguments that REDD+ projects which involve communities are more likely to save forests [55]. For: "Who can manage forests better than those living within or beside them? with REDD+ redefining the forest management and conservation landscape, community forest management can contribute to reduced forest emissions and increased forest carbon stocks [6] (pp. 201–202)".

Yet despite this focus on the importance of communities in REDD+, these texts also fail to explain or explore what they mean or imply by 'community'. They use the term as if it were self-evident (e.g., the otherwise very extensive REDD+-related glossary at the end of Angelsen et al. [51], for example, does not include an entry for 'community'). This follows earlier practice in highly influential publications on communities and forests, such as White and Martin [22], which also talked about communities without critical analysis of what this means. It is quite difficult to read between the lines to determine how communities are actually being imagined here. In terms of organizing natural resource management and REDD+, involvement of communities is seen as a 'third way' (other than regular government channels and the private sector). There are underlying pragmatic efficiency reasons for this, as the quote from Agrawal and Angelsen above indicates, but also ideological/political reasons related to the idea that the rights of poorer, small scale users to control their local resources need to be protected and bolstered to ensure that REDD+ does not give advantage to the more powerful elements, such as larger landowners and corporations. Along with this, it seems that the whole rural population is implicitly conceived as being made up of communities, and secondly that these communities are imagined largely as Agrawal and Gibson [12] suggest, although the list might be broadened. Specifically, communities appear to be envisaged as relatively small territorial and placed-based social groupings (1) that are positioned outside the normal hierarchy of government administration, (2) that have some form of internal, communal decision making procedure which may be based on traditional/indigenous rules or on other norms and procedures, (3) that may or may not have formal rights to land and forest and may or may not have communal forest land, and that (4) under favorable conditions, are expected to be able to act as a unit to manage the forest to meet common goals.

Whilst this last expectation does imply the ability to work towards common goals, it is less clear whether communities are understood in these texts to have homogeneous social structures and shared

norms [12,56]. The shared norms which supposedly help communities to manage common properties are usually understood to be rooted not just in shared ethnicity, religion, and history, but also in the fact that members have similar livelihoods strategies, seen as contributing to internal harmony. The way that the REDD+ discussion on equity has developed offers interesting insight into this issue. Although there have been a number of interesting discussions on the meaning of equity in REDD+ in academic literature [57–60], the main focus at the policy level has been on safeguards and benefit sharing (see Table 2 for the case of UN-REDD). FCPF requires countries to provide and justify a benefits distribution plan that respects customary rights to lands and territories and that reflects broad community support "so that incentives are applied in an effective and equitable manner, and shared with those stakeholders most critical to protecting forests (the benefit sharing plan will provide details on the benefit-sharing process, related distribution criteria and timelines and types of beneficiaries)" [61]. Moreover, there is emphasis in these texts on the need to be gender inclusive and to protect the interests of marginalized groups (i.e., usually seen as marginalized communities), thus a generally pro-poor approach. However, they do not really peek into questions of equality (for example, as regards to size of landholdings) within communities and there is no requirement to carry out a class analysis at community level. This failure to attend to heterogeneity within communities, suggests that these texts do assume some degree of social homogeneity. This also applies to NGO literature, which critiques the social inclusivity of REDD+ programs. The Rights and Resources Institute [62] for example, deals with generalized issues such as community rights and community tenure, but does not broach questions of equity and fairness within communities. To our knowledge, this has been addressed, and only in the context of benefit sharing, in just two countries, Nepal [63] and Vietnam [64,65], where a formula to differentiate needs of the family (Nepal) or their individual contribution to increasing carbon stocks (Vietnam) has been used. We note that these benefit distribution systems relate to rewards for increases in carbon storage, rather than for decreased deforestation, which is much more difficult to link with individual behavior or position (see Skutsch et al., [60] for a detailed explanation). We also note in passing that lack of equality within communities does not necessarily mean there are no shared norms. In many communities, inequality is the norm and is accepted as such.

Table 2. Criteria relating to social equity established by the UN-REDD program on Social and Environmental Principles (SEP).

Criterion	Definitional Text
Criterion 4	Ensure the full and effective participation of relevant stakeholders in design, planning and implementation of REDD+ activities, with particular attention to indigenous peoples, local communities and other vulnerable and marginalized groups
Criterion 7	Respect and promote the recognition and exercise of the rights of indigenous peoples, local communities and other vulnerable and marginalized groups to land, territories and resources, including carbon
Criterion 8	Promote and enhance gender equality, gender equity and women's empowerment
Criterion 12	Ensure equitable, non-discriminatory and transparent benefit sharing among relevant stakeholders with special attention to the most vulnerable and marginalized groups
Criterion 13	Protect and enhance economic and social well-being of relevant stakeholders, with special attention to the most vulnerable and marginalized groups

6. Communities as Articulated in National Policy Documents

The eight Emissions Reductions Program documents revealed a range of uses of the term 'community', which in most cases was applied in several different senses even within one country document (Table 3). The term is used much more often in some countries (e.g., Mozambique) than in others (e.g., Costa Rica), even taking into account the length of the reports, and that six distinct meanings can be identified, as explained below.

Table 3. Meanings of the term 'community' in the Emissions Reduction Programs (ERP) documents submitted to the Forest Carbon Partnership Facility FCPF (frequency of occurrence in %). N—number of relevant references to the term 'community' in the national report; PP—pages; N/PP average occurrence of the term 'community' per page of the document.

Country	Rural Pop	Indigenous Cultural Group	Village (Without Decision Making Power)	Autono-mous Decision Making Unit	IP Territorial Decision Making Unit	Lowest Tier Administered	Not Clear	N	PP	N/PP
Mexico	9.9	1.9	0.6	85.2	0.0	0.0	2.5	162	285	0.56
Chile	27.8	7.7	0.0	0.0	18.0	39.2	7.2	194	358	0.54
Costa Rica	53.6	3.6	3.6	10.7	25.0	0.0	3.6	28	164	0.17
DCR	13.9	1.9	0.0	36.5	0.0	34.1	13.5	208	297	0.70
R. Congo	44.6	2.9	13.7	37.7	0.0	0.6	0.6	175	349	0.50
Ghana	46.1	2.3	12.5	38.3	0.0	0.0	0.8	128	254	0.50
Mozambique	28.9	0.2	4.3	66.6	0.0	0.0	0.0	515	272	1.89
Vietnam	8.6	3.4	88.0	0.0	0.0	0.0	0.0	266	182	1.46

The first important finding is that 'community' is very frequently (and some cases, predominantly) used not to refer to a group of people, their organizational form or governance, but simply to refer to the rural population. Examples are 'community awareness raising' and 'increasing community income'—where what is meant here is not community (in the sense of shared or communally decided), but the rural people in general, and this use is repeated in many reports, e.g., 'the resilience of communities to climate change'; 'access of communities to forest resources'; 'develop viable alternative livelihoods for local communities'; 'sustainable community livelihoods'; 'bushmeat is a primary source of income for communities', etc. In all such cases, terms such as 'rural families' or 'the local population' could equally well be used instead of 'community', since the reference is not to any specific organization, institution, or social grouping. We see here 'community' being used as shorthand for 'people'.

A second meaning of the term community is found in reference to indigenous peoples or indigenous cultures in general (i.e., not to specific communities such as local organizations). Statements such as ´Indigenous Law No. 6172 set forth that the indigenous reserves remain the property of indigenous communities´ Costa Rica ERP is a typical example of this. Thirdly, it is often used to refer to 'villages/settlements', i.e., the physical areas in which groups of people live (e.g., 'forest-fringe communities in the ER program area are ethnically diverse' (Ghana ERP)). In this sense, it implies a presence of people living together in groups, but without reference to any particular form of governance; however, we mostly used the term 'villages' to classify references to communities where there does not appear to be clear authority present that would enable the community to take charge of REDD+ implementation (e.g., 'Communities/villages are not legal administrative entities in Vietnam so are without decision making powers' (Vietnam ERP)).

However, in many cases, the term 'community' clearly relates to a form of governance, when it refers to communities in the sense of having a defined leadership system and mandate which could, for example, enable it to take charge of local implementation of REDD+. Here we discerned three more meanings of community. Firstly, there are communities that are independent of the government hierarchy, in the form of autonomous decision making units (e.g., 'internal organization among ejidos and communities, resulting from the weakening of their internal governance mechanisms, such as their general assembly, and their internal bodies, such as the ejido commissioner and the board of protection, are one of the main barriers to ensuring a successful development of activities' (Mexico ERP)). Then there are communities that specifically occupy indigenous peoples' reserves (i.e., 'different' from the majority of the rural population). For example, 'This diminishes the land use rights of local communities and leaves notably indigenous communities—those outside dedicated areas within concessions—in limbo' (ERP Republic of Congo). Finally, there are communities that belong to the (lowest tier of) the government hierarchy (e.g., 'The administrative organization comprises two former districts, 8 territories, 23 sectors, 66 communities, 4 towns and thousands of villages' (ERP DRC)). In allocating each mention of 'community' to these different categories, we have endeavored

to be as consistent as possible, and we included a 'not clear' category for cases where there was significant doubt.

The six different meanings associated with the term 'community' are shown in Table 3, in terms of the frequency with which they occur in each report (%). In Mexico, the term is exclusively used to refer to ejidos and comunidades indigenas, two different forms of communally organized agrarian nuclei which have legal land tenure over defined territories and clearly defined internal decision-making systems; they are independent of the government administration. Farmers and forest owners not living within these areas, but who might be engaged in REDD+, are in contrast referred to as smallholders or 'other landowners'. In Chile, 'community' is used both to refer to the lowest level of the formal government hierarchy, i.e., the commune (meaning municipality or county) and to indigenous communities living in areas over which they have communal tenure by law. In Costa Rica, it refers mainly to communities in indigenous territories, although other types of communities ('peasant communities', 'other rural communities') are sporadically mentioned in the report without further specification, as well as small landowners and farmers, who as in Mexico, are not considered to belong to communities. In Vietnam, 'community' most often refers to informal or traditional groups of people living in villages within the communes, which represent the lowest tier of the formal administrative system. Although there are traditional leaders in these villages, they do not enjoy formal powers, for example, the Civil Code does not permit these communities to own land as a group and they are not legal entities, so they cannot have bank accounts. The situation in the African countries is less clearly defined. In the DRC, R. Congo, and Ghana, communities are framed in the context of the traditional and customary system of chiefs. These traditional governance systems may fuse with the formal government system, for example in DRC, chiefs are usually appointed by the government as administrators at the village level. The DRC REDD+ document identifies the county or municipal level as the 'community' and smaller population centers nested within this, sometimes as 'villages' and sometimes (confusingly) also as 'communities'. In Ghana and the R. Congo, there are autonomous local level communities whose local leaders have some authority to make decisions about land use etc., although much of the land is in private hands through usufructure rights. Ghana already developed overarching umbrella institutions called Community Resource Management Areas (CREMAs) and envisages similar organizations for REDD+ called Hotspot Interventions Areas (HIA), which will be governed by a local governance board of land owners, land users, local authority entities, and community leaders (including leaders of minority groups), as the key players in the REDD+ strategy. This means that the 'community' is not seen as the focus in quite the same sense as in many other countries. Moreover, the target of the entire strategy is the individual cocoa farmer, not the community as a group. In Mozambique, the term 'Local Communities' (usually, but not always, capitalized) is specified in the Land Law to mean groups of people with communal title to the land and authority over its use.

In summary, we see that there exist quite different representations of communities in these different segments of policy making. These are all implicit rather than explicit, and while the national reports are more specific about the form their communities take, none of the sources really examine the nature of communities and their internal workings. There is an unquestioned assumption that a community approach will be efficient and will produce benefits for the rural people, with an underlying coda that suggests that all rural people are equally poor.

7. Discussion

At first sight, the different sets of REDD+ documents seem to represent communities in rather different ways. The policy texts developed at the level of the UNFCCC through national submissions and negotiations are not very specific about what defines a community, although they represent them as groups of people living in forest areas, which may or not have legal tenure over these resources. These texts appear to have been quite strongly influenced by lobby groups representing IPs, and most of the references to communities relate to safeguarding IP and community rights,

including the right to consultation, and emphasize their role as beneficiaries, whilst there is little reference to how they may be involved in the direct implementation of the policy. Given the lack of specificity, one could question why terms such as 'rural people' or 'small farmers and forest users' were not used instead of 'communities'. Evidently, 'communities' implies a level of organization and a means of communication which could be used directly by REDD+. The fact that 'communities' do not exist everywhere is simply bypassed, for convenience. The agencies that are promoting strong community involvement in the actual implementation of REDD+, including FCPF, UN-REDD+, and many international NGOs and research organizations do not provide a clear definition or critical discussion of communities either. However, as we have shown, these organizations also appear to imagine the entire rural population as made up of local territorially coherent communities, which are not part of the governmental administrative system, but are independent entities with their own decision-making systems. In these texts, a community approach appears in some ways to indicate a 'pro-poor' approach, since communities are considered to be 'poor'. However, it is noticeable that very few cases actually consider inequality within the community. This may reflect the dilemma mentioned already at the end of Section 5, i.e., the development industry in general supports the idea of self-determination at community level but at the same time demands equality, and these may be incompatible objectives. Interestingly, while these texts attribute great significance to communities in relation to REDD+, they also acknowledge that communities often do not have formal rights to forest or tenure over land and that they lack legal and technical skills for participation in REDD+, which means that the capacity of these communities to contribute to REDD+ may be limited.

In contrast, the individual country reports revealed quite a range of interpretations of 'community', reflecting their own national circumstances. Firstly, it was evident that in very many cases the term 'community' is being used not in the sense of a type of organization, but simply to refer to rural people in general, as a form of shorthand. Secondly, in at least two cases (Chile and DRC) 'communities' is a term, which, among other uses, is routinely used to mean municipalities or counties, i.e., the lowest tier of the government administration, which is very different from the view held by NGOs and support agencies, which clearly see communities as outside the normal government system. Thirdly, although in some countries 'communities' does imply place-based social groups that have the mandate to make their own decisions as territorial units, in others, this is not so clear. The role envisaged for communities varies, in some there is more emphasis on communities as beneficiaries, whilst others contain at least some practical suggestions for how they may be engaged in implementation. However, there is almost no reference to how existing social inequalities within communities might influence outcomes. In these national reports, the inequalities that are mentioned are only in terms of ethnicity or gender.

Thus, we may conclude that the first two sets of literature on REDD+ policy articulate a vision of communities that resembles Agrawal and Gibson's myth. We see an implicit assumption in the documents that all rural people are members of communities, which in principle could have the characteristics necessary for participation in REDD+. Community level REDD+ is seen as being for the general benefit of everyone without any reference to existing social inequalities within communities, other than gender and sometimes ethnicity (the euphemism 'marginalized groups' is often used in this context). Moreover, the engagement of communities is clearly seen as contributing to the effectiveness and legitimacy of REDD+. Importantly, this is done without clearly specifying how exactly, given their limitations, these communities will be able to live up to these expectations.

The interesting point is that the country reports display a whole range of different visions of community. In some cases, a wall-to-wall concept is employed, in others, only specific groups of people in specific areas are targeted; the forms of community governance vary and are more explicit in these reports. Aside from this, the function of communities in REDD+ is represented in terms rather similar to those used in the global texts. In that literature, there are expectations that communities can be capacitated to carry out REDD+ activities, and that this will promote an equitable, efficient, and legitimate approach to REDD+.

These observations raise questions about why, given the evident lack of community capacity in reality, and the social inequalities that quite clearly exist within communities, the idea that engaging communities in REDD+ will not only be effective but also egalitarian, continues to be evoked. While we agree to some extent with Pasgaard [66], that this can reflect pragmatic use of rhetoric to further the positions of actors at all levels, we suggest that in fact this formulation has a strong ideological appeal, which stems from particular political positions and social and environmental justice principles. It is also strengthened by lack of faith of many observers in government efficiency and sincerity regarding rural poverty alleviation, as well as by the general trend, also found in many official government rural development policies, towards the idea that local participation in decision making is positive and even necessary.

Apart from the concerns discussed above related to the realities and capacities of communities, this leaves the legitimacy of community-led decision making and implementation unaddressed. Following the majority of published literature on participation (for overviews and critical discussion see [25,37,67]), there is an implicit belief in REDD+ documentation on the global level that strengthening the relative bargaining power of rural people in the modern-day situation is unquestionably benign. Whilst we recognize that in some places there are strong alternative (traditional) forms of governance at the local level, particularly in the case of communities that identify themselves as indigenous people, taking this for granted overlooks the fact that in many cases community empowerment in REDD+ is likely to end up being inegalitarian or even undemocratic (see [68] for the case of REDD+ in Nigeria).

A second reason for the persistence of this myth is more pragmatic. The prior experience of the agencies that are promoting REDD+ is largely confined to projects such as community forest management and PES. These programs have been carried out in communities which possess at least some of the idealized characteristics described above, and which see themselves as management units. They are communities which were identified by government agencies or NGOs as potential partners or candidates for this kind of intervention, precisely because they possess these attributes. Although they may not represent the more general condition of the rural population, it has been expedient for some of these agencies to continue their programs in these kinds of communities and expand them with REDD+ objectives, and moreover it clearly influences the way these agencies conceive the situation and the possibilities for intervention in rural areas. However, there are many rural settlements where this kind of social organization is missing and where such initiatives have never been attempted because there is no mechanism for communication and negotiation, or where the label 'community' has been applied by external agents, but does not reflect local realities [14]. Therefore, all the literature on community level natural resource management is based on an inherently biased sample and this bias is being reproduced in REDD+. CIFOR's Global Comparative Study on REDD+, which used existing community forest management and payment for environmental services projects as proxies for REDD+ is a clear example of this. It is a bias which is extremely difficult to overcome, since programs such as REDD+ depend on being able to communicate both about and with local forest users. If these are not arranged into clusters with a recognizable contact point, i.e., in the form of 'communities', it is difficult to visualize how communication could be managed.

This brings us to our final point. The community myth persists because it performs, i.e., it does work. Pasgaard and Nielsen [14], for example, show in a case in Cambodia how conservation rhetoric is used at all levels, from local leaders to donor organizations, essentially to further own interests, and Blaikie [13] has a similar story for Botswana and Malawi. The propagation of the idea that community is central to REDD+ could be seen as an example of this. However, at the same time, the ideological attractiveness of performing communities in this way has enabled consensus about the direction of REDD+ (as unspecific as this direction may be). It has also worked to reinforce the legitimacy of NGOs and other agencies that collaborate with communities, where these do in fact exist and to advocate for their rights, resulting in the potential for new project funding for collaborative work under the banner of REDD+. Therefore, although the visions of community in REDD+ may not be real in a literal or material sense, they are clearly a reality that actors have chosen to believe

in and from which they stand to benefit. This means that they are real in their consequences [69]. Whether or not REDD+ will be able to shape the reality of actual communities according to its vision is an open question. Past experiences in community based natural resource management does suggest that this is possible. The initiation of community-based arrangements and institutions can re-order social relations and remake communities to fit with this myth. This is in fact the basis of the Ostrom tradition in institutional analysis and natural resource management. Moreover, in a recent analysis of the Payment for Environmental Services program in Mexico, McCall et al. [70] find evidence that the presence of this program, which provides relatively easy money to communities that can justify a case for it, may in fact have served as an opportunity and incentive for communities to create, or revive, the necessary decision making apparatus which may have earlier fallen into abeyance due to historical circumstances, i.e., it has formed the modern 'community glue'. Newton et al. [7] have also made the case for how REDD+ is strengthening existing CFM initiatives in Nepal.

Policies are often built on myths, which does not always invalidate them or even necessarily result in failure. Policies built on myths can sometimes transform the situation they are designed to address. However, the power of myths lies not only in the ideals they imagine, but also in what they obscure, and so there will always be unpredictable outcomes. The strong attachment to the community myth could be the fuel through which REDD+ becomes a widespread catalyst for positive change, but it may also cause blindness in terms of the practical implications for communities, which will ultimately do them a disservice.

Author Contributions: Conceptualization, M.S. and E.T.; Methodology, M.S. and E.T.; Software, M.S.; Writing—Original Draft Preparation, M.S. and E.T.; Writing—Review & Editing, M.S. and E.T.

Funding: This research received no external funding.

Acknowledgments: We would like to thank two anonymous reviewers whose comments were very helpful in improving the arguments presented in this paper.

Conflicts of Interest: The authors declare no conflicts of interest

References

1. UNFCCC. Key Decisions Relevant for Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD+). Available online: http://unfccc.int/files/land_use_and_climate_change/redd/application/pdf/compilation_redd_decision_booklet_v1.2.pdf (accessed on 30 June 2017).
2. FCPF. *A Guide to the FCPF Readiness Assessment Framework*; Forest Carbon Partnership Facility; World Bank: Washington, DC, USA, 2013.
3. Frequently Asked Questions and Answers—REDD+ and the UN-REDD Programme. Available online: https://www.google.com.tw/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwio-ei55f_dAhVDFYgKHQAbCBMQFjAAegQICRAC&url=http%3A%2F%2Fwww.unredd.net%2Findex.php%3Fview%3Ddownload%26alias%3D6207-un-redd-faqs-and-answers-june-2010-1-6207%26category_slug%3Dadditional-resources-1312%26option%3Dcom_docman%26Itemid%3D134&usg=AOvVaw3lroOjJsUzG9z-MQCqPfVb (accessed on 11 October 2018).
4. Jurgens, E.; Kornexl, W.; Oliver, C.; Gumartini, T.; Brown, T. *Integrating Communities into REDD+ in Indonesia*; PROFOR: Washington, DC, USA, 2013.
5. Ball, S.; Makala, J. *Making REDD+ Work for Communities and Forests: Three Shared Lessons for Project Designers*; IIED: London, UK, 2014.
6. Agrawal, A.; Angelsen, A. Using community forest management to achieve REDD+ goals. In *Realizing REDD+: National Strategy and Policy Options*; CIFOR: Bogor, Indonesia, 2009.
7. Newton, P.; Schaap, N.; Fournier, M.; Cornwall, M.; Rosenbach, W.; DeBoer, J.; Whittemore, J.; Stock, R.; Yoders, M.; Brodnig, G.; et al. Community forest management and REDD+. *For. Policy Econ.* **2015**, *56*, 27–37. [CrossRef]
8. Bluffstone, R.; Robinson, E.; Guthiga, P. REDD+ and community-controlled forests in low-income countries: Any hope for a linkage? *Ecol. Econ.* **2013**, *87*, 43–55. [CrossRef]

9. Corbera, E.; Schroeder, H. Governing and implementing REDD+. *Environ. Sci. Policy* **2011**, *14*, 89–99. [CrossRef]
10. Saeed, A.-R.; McDermott, C.; Boyd, E. Are REDD+ community forest projects following the principles for collective action, as proposed by Ostrom? *Int. J. Commons* **2017**, *11*, 572–596. [CrossRef]
11. Ece, L.; Murombedzi, J.; Ribot, J. Disempowering democracy: Local representation in community and carbon forestry in Africa. *Conserv. Soc.* **2017**, *15*, 357–370.
12. Agrawal, A.; Gibson, C. Enchantment and Disenchantment: The role of community in natural resource management. *World Dev.* **1999**, *27*, 629–649. [CrossRef]
13. Blaikie, P. Is small really beautiful? Community based natural resource management in Mlawi and Botswana. *World Dev.* **2006**, *34*, 1942–1957. [CrossRef]
14. Pasgaard, M.; Nielsen, T.F. A story of "communities": Boundaries, geographical composition and social coherence in a forest conservation project, Northern Cambodia. *Geogr. Tidsskr.* **2016**, *116*, 134–146. [CrossRef]
15. Berkes, F. Re-thinking community-based conservation. *Conserv. Biol.* **2004**, *18*, 621–630. [CrossRef]
16. Ostrom, E. *Governing the Commons: Evolution of Institutions for Collective Action*; Cambridge University Press: Cambridge, UK, 1990.
17. Ojha, H.R.; Ford, R.; Keenen, R.; Race, D.; Carias Vega, D.; Baral, H.; Sapkota, P. Delocalising communities: Changing forms of community engagement in natural resources governance. *World Dev.* **2016**, *87*, 274–290. [CrossRef]
18. Larson, A.M.; Pulhin, J.M. Enhancing forest tenure reforms through more responsive regulations. *Conserv. Biol.* **2012**, *10*, 103–113. [CrossRef]
19. Larson, A.M.; Brockhaus, M.; Sunderlin, W.D.; Duchelle, A.E.; Babon, A.; Dokken, T.; Pham, T.T.; Resosudarmo, I.A.P.; Selaya, G.; Awono, A.; et al. Land tenure and REDD+: The good, the bad and the ugly. *Glob. Environ. Chang.* **2013**, *23*, 678–689. [CrossRef]
20. FAO. *Tenure of Indigenous Peoples Territories and REDD+ As a Forestry Management Incentive: The Case of Mesoamerican Countries*; UN-REDD Programme Secretariat: Geneva, Switzerland, 2012.
21. Duchelle, A.; Cromberg, M.; Gebara, M.F.; Guerra, R.; Sunderlin, W.D. Linking forest tenure reform, environmental compliance, and incentives: Lessons from REDD+ initiatives in the Brazilian Amazon. *World Dev.* **2014**, *55*, 53–67. [CrossRef]
22. White, A.; Martin, A. *Who Owns the World's Forests? Forest Tenure and Public Forests in Transition*; Forest Resources and Centre for Environmental Law: Washington, DC, USA, 2002.
23. Gilmour, D. *Forty Years of Community Based Forestry: A Review of Its Extent and Effectiveness*; FAO: Rome, Italy, 2016.
24. Turnhout, E.; Gupta, A.; Weatherley-Singh, J.; Vijge, M.J.; de Koning, J.; Visseren-Hamakers, I.J.; Herold, M.; Lederer, M. Envisioning REDD+ in a post-Paris era: Between evolving expectations and current practice. *WIREs Clim. Chang.* **2017**, *8*, e425. [CrossRef]
25. Cooke, B.; Kothari, U. *Participation, the New Tyranny?*; Zed Books: London, UK, 2001.
26. Andersson, K.P.; Smith, S.M.; Alston, L.J.; Duchelle, A.E.; Mwangi, E.; Larson, A.M.; Sassi, C.; Sills, E.O.; Sunderlin, W.D.; Wong, J.Y. Wealth and the distribution of benefits from tropical forests: Implications for REDD+. *Land Use Policy* **2018**, *72*, 510–522. [CrossRef]
27. Pelletier, J.; Horning, M.; Laporte, N.; Samndong, R.A.; Goetz, S. Anticipating social equity impacts in REDD+ policy design: An example from the Democratic Republic of Congo. *Land Use Policy* **2018**, *75*, 102–115. [CrossRef]
28. Dunlop, T.; Corbera, E. Incentivizing REDD+: How developing countries are laying the groundwork for benefit-sharing. *Environ. Sci. Policy* **2016**, *63*, 44–54. [CrossRef]
29. Mbeche, R. Climbing the ladder of participation: Symbolic or substantive representation in preparing Uganda for REDD+. *Conserv. Soc.* **2017**, *15*, 426–438. [CrossRef]
30. Marfo, E.; Acheampong, E.; Opuni-Frimpong, E. Fractured tenure, unaccountable authority, and benefit capture: Constraints to improving community benefits under climate change mitigation schemes in Ghana. *Conserv. Soc.* **2012**, *10*, 161–172. [CrossRef]
31. Igoe, J.; Fortwangler, C. Whither communities and conservation? *Int. J. Biodivers. Sci. Manag.* **2007**, *3*, 65–76. [CrossRef]
32. Turnhout, E. The politics of environmental knowledge. *Conserv. Soc.* **2018**, *16*, 363–371. [CrossRef]
33. Scott, J. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*; Yale University Press: New Haven, CT, USA, 1998.

34. Anderson, B. *Imagined Communities: Reflections on the Origin and Spread of Nationalism*; Verso Books: London, UK, 2006.
35. Callon, M. *The Laws of the Markets*; Blackwell: Oxford, UK, 1998.
36. Turnhout, E.; Skutsch, M.; de Koning, J. Carbon Accounting. In *Research Handbook of Climate Governance*; Bäckstrand, K., Lövbrand, E., Eds.; Edward Elgar: London, UK, 2015; pp. 366–376.
37. Turnhout, E.; van Bommel, S.; Aarts, N. How participation creates citizens: Participatory governance as performative practice. *Ecol. Soc.* **2010**, *15*, 26. [CrossRef]
38. Arts, B.; Behagel, J.; Turnhout, E.; de Koning, J.; van Bommel, S. A practice based approach to forest governance. *For. Policy Econ.* **2014**, *49*, 4–11. [CrossRef]
39. Behagel, J.; Arts, B.; Turnhout, E. Beyond argumentation: A practice-based approach to environmental policy. *J. Environ. Policy Plan.* **2017**, *7*, 1–13. [CrossRef]
40. Law, J. Seeing like a survey. *Cult. Sociol.* **2009**, *3*, 239–256. [CrossRef]
41. Law, J.; Urry, J. Enacting the social. *Econ. Soc.* **2011**, *33*, 390–410. [CrossRef]
42. Marres, N. The issues deserve more credit: Pragmatist contributions to the study of public involvement in controversy. *Soc. Stud. Sci.* **2007**, *37*, 759–780. [CrossRef]
43. Dewey, J. *The Public and Its Problems*; Holt Publishers: New York, NY, USA, 1927.
44. Available online: http://unfccc.int/ (accessed on 30 June 2017).
45. Available online: http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf (accessed on 30 June 2017).
46. Wallbott, L. Indigenous Peoples in UN REDD+ Negotiations: "Importing Power" and Lobbying for Rights through Discursive Interplay Management. *Ecol. Soc.* **2014**, *19*, 21. [CrossRef]
47. Doolittle, A.A. The politics of indigeneity: Indigenous strategies for inclusion in climate change negotiations. *Conserv. Soc.* **2010**, *8*, 286–291. [CrossRef]
48. Skutsch, M. The evolution of international policy on REDD+. In *Oxford Research of Encyclopedia of Climate Science: Policy, Politics and Governance*; Oxford University Press: Oxford, UK, 2017.
49. UNFCCC. *Views on the Range of Topics and Other Relevant Information Relating to Reducing Emissions from Deforestation in Developing Countries: Submissions from Intergovernmental Organizations*; UNFCCC: Bonn, Germany, 2007.
50. UNFCCC. *Views on Types of Information from Systems for Providing Information on How the Safeguards Are Being Addressed and Respected and That May Be Provided by Developing Country Parties: Submissions from Parties and Admitted Observer Organizations*; UNFCCC: Bonn, Germany, 2014.
51. Available online: www.conservation.org/publications/Pages/climate_change_and_the_role_of_forests.aspx (accessed on 5 July 2017).
52. Angelsen, A.; Brockhaus, M.; Kanninen, M.; Sills, E.; Sunderlin, W.D.; Wertz-Kanounnikoff, S. *Realising REDD+: National Strategy and Policy Options*; CIFOR: Bogor, Indonesia, 2009.
53. Available online: www.cifor.org/gcs/about-gcs-redd (accessed on 17 September 2017).
54. Available online: www.asb.cgiar.org/PDFwebdocs/Local%20Perspectives%20on%20REDD.pdf (accessed on 17 September 2017).
55. Available online: www.worldagroforestry.org/news/community-participation-redd-not-what-it-should-be (accessed on 17 September 2017).
56. Ostrom, E. Collective action and the evolution of social norms. *J. Econ. Perspect.* **2000**, *14*, 137–158. [CrossRef]
57. McDermott, M.; Mahanty, S.; Schrekenberg, K. Examining equity: A multidimensional framework for assessing equity in payments for ecosystem services. *Environ. Sci. Policy* **2013**, *30*, 416–427. [CrossRef]
58. Sikor, T.; Stahl, J.; Enters, T.; Ribot, J.; Singh, N.; Sunderlin, W.; Wollenberg, L. REDD-Plus, forest people's rights and nested climate governance. *Glob. Environ. Chang.* **2010**, *20*, 423–425. [CrossRef]
59. Karsenty, A.; Vogel, A.; Castell, F. "Carbon rights", REDD+ and payments for environmental services. *Environ. Sci. Policy* **2014**, *35*, 20–29. [CrossRef]
60. Skutsch, M.; Simon, C.; Velazquez, A.; Fernández, J.C. Rights to carbon and payments for services rendered under REDD+: Options for the case of Mexico. *Glob. Environ. Chang.* **2013**, *23*, 813–825. [CrossRef]
61. Available online: https://www.forestcarbonpartnership.org/sites/fcp/files/2013/june2013/Carbon%20Fund-web_1.pdf (accessed on 6 May 2018).
62. RRI. *Community Rights and Tenure in Country Emission Reduction Programs: Status and Risks for the FCPPF Carbon Fund*; Rights and Resources Initiative: Washington, DC, USA, 2016.

Available online: http://rightsandresources.org/wp-content/uploads/2016/06/RRI_Community-Rights-and-Tenure-in-Country-Emission-Reduction-Programs_June-2016.pdf (accessed on 3 September 2017).

63. Maraseni, T.N.; Neupane, P.R.; Lopez-Casero, F.; Cadman, T. An assessment of the impacts of the REDD+ pilot project on community forests user groups (CFUGs) and their community forests in Nepal. *J. Environ. Manag.* **2014**, *1367*, 37–46. [CrossRef] [PubMed]
64. Hoang, M.A.; Do, T.H.; Pham, M.T.; va Nordwijk, M.; Minang, P. Benefit distribution across scales to reduce emissions from deforestation and forest degradation (REDD+) in Vietnam. *Land Use Policy* **2013**, *31*, 48–60. [CrossRef]
65. Enright, A.; McNally, R.; Sikor, T. *An Approach to Designing Pro-Poor Local REDD+ Benefit Distribution Systems: Lessons from Vietnam*; SNV: Hanoi, Vietnam, 2012.
66. Pasgaard, M. Lost in translation: How project actors shape REDD+ policies and outcomes in Cambodia. *Asia Pac. Viewp.* **2015**, *56*, 111–127. [CrossRef]
67. Chilvers, J.; Kearnes, M. *Remaking Participation: Science, Environment and Emergent Publics*; Routledge: Abingdon, UK; Oxfordshire, UK; New York, NY, USA, 2016.
68. Nuesiri, E.O. Feigning democracy: Performing representation in the UN-REDD funded Nigeria-REDD Programme. *Conserv. Soc.* **2017**, *17*, 384–399. [CrossRef]
69. Thomas, W.I.; Thomas, D.S. Situations defined as real are real in their consequences. In *Social Psychology through Symbolic Interaction*; Stone, G.P., Farberman, H.A., Eds.; Xerox College Publishing: Waltham, MA, USA, 1970; pp. 154–155.
70. McCall, M.K.; Bermudez, R.; Granados, J. Signing up to PES—Why communities participate in PES programmes in Mexico. In *Co-Investment in Ecosystem Services: Global Lessons from Payment and Incentive*; (ICRAF): Nairobi, Kenya, 2017.

The Performance of REDD+: From Global Governance to Local Practices

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Received: 29 July 2019; Accepted: 17 September 2019; Published: 24 September 2019

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1. Introducing REDD+ and the Need to Address Performance

Whilst 'REDD' is the acronym for reducing emissions from deforestation and forest degradation, 'REDD+' refers to efforts to reduce emissions from deforestation and forest degradation, foster conservation, promote the sustainable management of forests, and enhance forest carbon stocks [1]. The basic idea behind REDD+ is that more carbon is sequestrated and stocked in tropical forests by improving their conservation, management, and sustainable use, thus contributing to mitigating climate change. Developing countries and relevant stakeholders will be financially compensated for these endeavors, either through public funds or carbon markets.

First known as "Avoided Deforestation" (AD) and discussed as a mitigation option at the United Nations Framework Convention on Climate Change (UNFCCC) in the early 2000s, AD subsequently became RED, REDD, and REDD+, with the concept expanding to incorporate forest conservation, management, and use [2]. Whereas RED was 'just' an innovative proposal tabled by Costa Rica and Papua New Guinea in 2005, REDD activities were outlined in the Bali Action Plan resulting from the 13th Conference of Parties to the UNFCCC (COP 13) in 2007, to become a legally-binding article in the 2015 Paris Agreement. In between these events, international bodies such as the World Bank, United Nations Development Program (UNDP), and United Nations Environment Program UNEP, and developed countries (notably Norway, Germany, the UK, Australia, and the US), started REDD+ programs and funds, and developing countries entered into so-called "readiness activities" to prepare for participation in REDD+. Currently, hundreds of REDD+ projects are being implemented around the world [3], whilst REDD+ has changed considerably over time, being previously described as "the world's largest experiment in Payments for Ecosystem Services" [4], and more recently, as results-based aid [5]. The performance of REDD+ has been largely measured in terms of emission reductions calculated on the basis of forest reference (emission) levels (National or subnational reference levels expressed as tonnes of CO2 equivalent per year for a reference period against which emissions and removals from a results period are compared, serving as benchmarks for assessing the national performance in terms of implementing REDD+ activities). This reduction of expected results is then assumed to have been compensated for by results-based finance (RBF), as was the case for Brazil, through payments from the Green Climate Fund in early 2019. The Bali Action Plan requires REDD+ projects to measure changes in net carbon emissions resulting from project activities. In 2013, the COP19 adopted the Warsaw Framework for REDD+, where results-based payments can be made once safeguards have been addressed and respected. The Measurement, Reporting, and Verification (MRV) of RBF were elaborated at COP24 in Katowice, Poland, December 2018, with MRV capacities being reported as increasing [6].

However, many observers, stakeholders, and scholars are critical. Carbon markets have not developed as was envisioned in 2005, and the efficiency and effectiveness of REDD+ to mitigate climate change have been questioned, with projects' impacts being unclear. As Angelsen et al. [7] state, "As an idea, REDD+ is a success story (...).Yet a decade after being launched in the Bali Action Plan (UNFCCC 2007), broad consensus is that—in practice—REDD+ has not met the world's high expectations". While some studies have reported positive impacts of REDD+ in terms of forest carbon [8–13], the expected transformational change away from business as usual of deforestation and forest degradation has not taken place thus far. Forest cover loss and tropical deforestation mainly driven by agricultural and forestry commodities trade continue [14–17]. The results of REDD+ in terms of sharing the burdens, costs, and benefits have been questioned [18]. The progress of policy reforms seen as underpinning REDD+, such as tenure reform, has also been questioned [19]. For some, the lack of performance is a result of major flaws in the design of the instrument itself (as a market-based payment-for-ecosystem-services scheme (PES) and has led to the claim that "REDD+ is dead" [20]. Others argue that rather than blaming the instrument itself, there is a need to consider the wider environment in which REDD+ was supposed to perform and deformations of the initial PES idea this environment created, with powerful actors interested in maintaining the status quo, leading to inefficiency [21]. However, as Angelsen et al. [7,21] suggest, REDD+, as both an innovative governance mechanism and a political process, will finally perform, as climate change becomes more pressing, carbon markets improve, and technical issues related to the efficiency and effectiveness of REDD+ are solved. Nonetheless, as Wong et al. [22] pointed out, a performance or results-based payment approach is no guarantee for an effective and transparent REDD+. Their analysis of narratives underlying REDD+ benefit sharing mechanisms highlights the importance of linking payments for performance to the contexts in which the results are defined and agreed upon, along with the conditions enabling social and political acceptance [22].

Given this context, this special issue is timely in addressing the need to assess the political and socio-economic dimensions of the performance of REDD+, which are of relevance for policy-makers, practitioners, and scholars. This implies taking into account the various levels (from the global to the local) and dimensions (e.g., results-based payments, MRV, co-benefits, and community engagement), as well as different (disciplinary) connotations of performance. We therefore pose the following question: what does performance mean? In answering it, we provide examples of assessments of performance. In our conclusion, we reflect on the representativeness of these examples and their limitations when looking at the current range of REDD initiatives, along with what is missing in terms of evaluating the performance of REDD+. We finish by concluding why performance assessment remains so relevant today.

2. 'Performance' Means Different Things

'Performance' refers to the act or process of executing a task or function. Hence, the concept of performance moves beyond an account of results and related payments, and includes the process leading to the result, even though performance and results are often used interchangeably. In this Special Issue, performance means whether a public policy, program, or project 'works'; delivers its promises; or achieves its previously set objectives [23]. As a wider concept, performance can be understood and evaluated differently [24]. As the following subsections—and the individual papers in this special issue—show in greater detail, it can refer to (i) the economic (cost)effectiveness of policies; (ii) multi-criteria achievements; or (iii) evaluation models based on the notions of output, outcome, and impact. Alternative ways of evaluating performance, presented in the last two subsections below, assess how (iv) impacts are 'performed' or 'staged' by stakeholders, independently of what's happening on the ground, or how (v) certain policy discourses 'produce' certain implementation and evaluation practices, and not others, which is referred to as 'performativity' [25].

2.1. Policy Effectiveness

Economics has dominated policy evaluation, where performance is equated with (cost) effectiveness, efficiency, relevance, and sustainability based on the objectives of a policy [26–28]. In the REDD+ literature, the distinction between cost-efficiency and outcome effectiveness is prominent (see, for example, [1,29,30]). Two evaluation methods are commonly used: ex-post, often qualitative or mixed methods assessments of the degree to which policy objectives are attained within the policy's timeframe, and ex-ante, often the quantitative, statistical analysis of future costs and benefits of policy measures, measured against current and future values, based on discount rates [31].

For REDD+, this implies comparing result-based payments from carbon funds and markets for forest managers at the end of the policy's time frame, compared to the costs incurred, by using a cost–benefit analysis of REDD+ initiatives. Correa et al. [32] detail the allocation of financial resources from the USD 667 million Brazilian Amazon fund across different stakeholders for scientific and technological development, sustainable production, monitoring and control, and land tenure regularization. However, in terms of the forest conservation effectiveness, as well as emissions reductions from deforestation, they found that deforestation rates had risen since 2013, despite increased fund disbursements. Samndong and Vatn [33] took a qualitative approach to show the lack of effectiveness and legitimacy of REDD+ projects in the Équateur province in the DR Congo. Umunay et al. [34] hypothesized ex-ante the run of three policy mechanisms to reduce commodity-driven deforestation. They examined 19 cases where REDD+ programs, jurisdictional approaches (JAs), and private sector commitments intersect, evaluating potential options against established criteria. They found that most were located in countries with high deforestation rates—attracting REDD+ program, JA, and private sector commitment activities. These policies alone did not appear effective in countering tree cover loss; however, when operating together, these efforts were seen to have potential to reduce commodity-driven deforestation, enhancing and complementing each other. Overman et al.'s [35] economic analysis of the impact of national REDD+ programs in Guyana suggests that indigenous communities with legal forest tenure benefited financially in terms of cash income. However, there were modest benefits from commercial forest uses, and extremely skewed private-public sharing of net revenue from forest-based resources and inhibitive forest damage costs at rising carbon prices. Moreover, carbon stocks were substantially lower in locally-managed forests.

2.2. Multi-Criteria Policy Achievements

Alongside the economic view on policy performance are juridical, administrative, and political perspectives, with scholars and practitioners increasingly using a combination of criteria and approaches from different traditions. An example is the JEP Triangle, which uses Juridical, Economic and Political indicators for policy performance [36]. Besides efficiency, criteria such as legitimacy, justice, legality, democracy, and participation, are also considered important. Ex-post and ex-ante evaluations and ex-nunc (often legal-based) approaches may be used. The latter evaluate policy processes "from now on" rather than (projected) impacts.

For REDD+, this, for example, implies the assessment of community participation in projects, not only to evaluate the degree of democracy in project implementation, but also the effectiveness of community achievements towards the 'triple-win' of climate change mitigation, biodiversity conservation, and community development. Millbank et al.'s [37] review of 25 sub-national REDD+ projects across the world that adhere to Climate, Community, and Biodiversity Alliance (CCB) REDD+ certification standards embraced a much broader set of objectives than just REDD+. However, a gap was found, with few projects actively monitoring the impact against these goals and progress, and only a third of the sustainable development goals targeted by REDD+ projects showing 'improvement'. Samndong and Vatn [33] examined the DR Congo REDD+ program in terms of its effectiveness in protecting forests for carbon storage and alleviating rural poverty, and its appropriateness as a governance tool. They found that the lack of harmonization between REDD+ as an instrument

promoted by the international community created a competition between state and customary authorities. This allowed powerful actors to 'shop' between systems and legitimize their increased use and control of forest resources. Weatherley-Singh and Gupta [38] discuss the implications of European Union policies on "embodied deforestation" targeting EU agricultural commodity imports as drivers of deforestation. They find that despite substantial debate, policy measures for reducing the impact of the EU's consumption of agricultural commodities associated with multiple drivers of tropical deforestation have not been developed. However, they see potential for a more integrated EU policy approach to tackling tropical deforestation.

2.3. Policy Outputs, Outcomes, and Impacts

Policy performance is also equated with 'impact' [39]. The concept of impact arguably derives from Easton's [40] political system approach, with the output-outcome-impact model common in impact evaluation and impact assessment widely used in organization studies, conflict studies, international relations, and development studies [41]. The model is based on the notion that policies lead to interventions (on a macro, meso, or micro level) that aim to have a positive societal impact. Interventions result in *outputs,* tangible actions, reports, products, and/or commitments expressed in projects, programs, law, funds, etc. Outputs ideally result in behavioural changes, in outcomes, manifested at a (usually short-term) temporal scale and at different spatial scales, such as on a national macro-economic, ecosystem or landscape, sector, firm, community, household, and individual level. Outcomes can be influenced by contextual factors, such as cultural, political, and the business environment factors. The ultimate effects of policies and outcomes are impacts: the actual contributions to intended problem solving and opportunity seeking. Often, evidence on the counterfactual (what would have happened without the intervention) is gathered to provide a comparison in evaluations. A theory of change is used to articulate assumptions about the process through which such impacts will occur and accompanying assumptions envisaged in an impact pathway, often with verifiable and measurable indicators of the output, outcome, and impact.

For REDD+, this implies the analysis of outputs (such as a single REDD+ project), outcomes (for example, behavioral changes of forest managers due to REDD+ initiatives), and/or impacts (such as an increase of carbon sequestration and carbon stocks in a forest) in a specific landscape. Correa et al. [32] attribute the apparent lack of effectiveness to the distribution mechanism of the Brazilian Amazon fund that prioritized diverse organizations rather than a strategic selection of projects due to its predetermined theory of change. Rosa da Conceição et al. [42] looked at REDD+ in Ecuador and Peru and the pathways of two government-led, incentive-based forest conservation and poverty reduction programs for forest-based populations. They found that political interests affected policy design, resulting in trade-offs for longer-term societal efficiency in favor of short-term administrative goals. Non-environmental outcomes were often prioritized, due to perceptions of political feasibility, the influence of non-environmental government agencies, and beliefs in specific government roles or public responses. Overman et al.'s [35] evaluation of the performance of REDD+ in Guyana map out an economic foundation for a national REDD+ low-emissions impact pathway towards changing forest governance. They suggest that REDD+ can provide the incentives needed for governments to counter the drivers that threaten forest-dependent people because concessions, or land grabs allowed by the government (as often observed in other countries), are costly. In this specific context, maintaining the forest, and hence its management by forest-dependent people, results in low emissions and incomes from REDD+, in contrast to higher emissions due to conversion or forest concessions.

2.4. The Way to Success is 'Performed' by Stakeholders

One of the main challenges in the evaluation of programs and projects relates to the credibility of what is reported, what was measured and how, and the overall policy relevance of the evaluation itself. Relevance here refers to the relevance of the overall goals of the policies vis a vis the key problems [28], and hence focuses on the assessment of policy documents and matches between the policy problem at

hand and the goals stated. The policy relevance of an evaluation itself can also refer to the relevance of the measures selected to assess impacts, asking if what is assessed is actually of policy relevance and useful for identifying appropriate policies and measures to tackle the overall problem. While methods used to assess and monitor impacts can increase rigor and robustness [26,43], some of the factors that can undermine the credibility and legitimacy in REDD+ assessments are the often cited issues of poor documentation, costs, time, and technical capacities [44,45]. Beyond these, credibility and legitimacy are jeopardized by a strong inclination to frame results as overly positive, whatever the 'real' effects on the ground [46]. Therefore, there are (implicit) biases in any evaluation method to produce positive results, which affects their credibility. In addition, many stakeholders engaged in evaluations may be biased: evaluators paid to assess projects; project participants hoping for an extension and new resources; politicians with political motives and careers; and scientists with a bias for publication impact. In other words, many interests converge towards performing or staging projects as 'successes'.

The papers in this issue highlight that REDD+ evaluations indeed encounter risks of positive framing in practice. This appears as not necessarily deliberate, but emerges from the interests and sympathies of those involved. For REDD+, this implies that a critical assessment is needed of how and why project evaluations are biased towards success stories, or how some stakeholders tell positive stories to evaluators, while the situation on the ground is rather different. Another emerging aspect is how local actors express agency in (re)framing and changing the narratives of performance according to their own interests, beyond those paying for a "good performance". These experiences highlight the importance of both local context and culture, as well as subnational, national, and international interests, in understanding performance narratives. Correa et al. [32] recount the significant investments in the Brazilian Amazon fund, widely seen as successful. However, when dissected, the funds' performance reflects the arbitrary support of different projects adopting highly different theories of change, many of which are not chiefly interested in reducing deforestation, but based on the stakeholder's own preferences and activities. In the DR Congo, a study on the performance of the REDD+ program [33] highlights the exclusion of some timber and charcoal actors, which has detrimental effects on the effectiveness and legitimacy of REDD+, but which is not reported back to the program [47]. Additionally, Millbank et al. [18] find a marked gap in 25 subnational, CCB-certified REDD+ projects between aspirations on paper and the monitoring of progress.

2.5. The 'Performativity' of Policy Discourse

Where classical evaluation studies examine how policy performs after implementation, they often take policy discourses for granted and use external yardsticks (such as effectiveness, efficiency, and/or legitimacy) to assess their performance. This approach is problematized by 'performativity' scholars [25,48], who argue that performance is not only a function of the (un)intended effects of implementing policy, but also of the policy discourse itself. Discourses 'make' certain objects and subjects, whilst (un)intentionally excluding others, and so constitute certain implementation and evaluation practices. This has implications for the representation and inclusiveness of such policies.

For REDD+, this implies the analysis of how certain types of stakeholders are pre-defined in REDD+ project narratives, while others are implicitly or explicitly excluded. It could also imply the problematization of the use of certain benchmarks to assess the success and failure of REDD+, because these produce their own assessment realities, while excluding others, for example, those of local practitioners. Skutsch and Turnhout [49] illustrate this performative aspect of REDD+ policies, which frame communities as both beneficiaries and implementation agents. They note that international policies generally do not clarify who or what communities actually are. Their analysis of international and national policy documents on REDD+ worldwide demonstrates the unreality and disconnection between scales and the heterogeneity of communities targeted in national REDD+ policies. They close on a note of warning (p. 13), expressing that the attachment within policy discourses to the "community myth" could catalyze positive change, but "may also cause blindness in terms of the practical implications for communities, that will ultimately do them a disservice". At the same time, communities

are not passive, docile receivers of REDD+. Den Besten and colleagues [50] portray the on-the ground practices between global policymaking and local implementation in Ghana. Whilst global actors led the implementation of REDD+ in a cocoa production landscape in the high forest area, they depended on local actors to make REDD+ work. Consequently, it was integrated into existing community-based conservation, forest restoration, and agro-forestry practices, thus transforming REDD+ to resemble these local practices.

3. Conclusions

This special issue aims to take stock of the current state of REDD+ performances. The papers reflect the diverse understandings of what constitutes performance and performativity. They also show a broad range of methods used to assess performance, from qualitative in-depth studies to quantified, statistically rigorous approaches, with most papers reflecting on a relatively small number of comparative cases; thus, the representativeness of these examples is limited. Systematic reviews and studies assessing large numbers of cases and employing a counterfactual approach are notably absent among the papers in this issue and can be seen as missing in the suite of approaches which can be used to evaluate performance. Taking all papers together, an overall conclusion about the performance of REDD+ remains challenging, with most papers providing a rather bleak outlook, and some being somewhat more optimistic in their assessment. REDD+ exhibits potential to bring about change: it can contribute to achieving international objectives and targets (Paris Agreement, SDGs); bring substantial income to communities who sustainably manage their forests against the trend of forest conversion; it can reduce deforestation once various approaches are smartly combined (private sector and juridical approach); and it appears to re-energize 'old-fashioned' forest management approaches (such as community forestry and forest restoration). At the same time, the papers also show that the rhetoric is stronger than the evidence of practices on the ground; that short-term, administrative interests overshadow long-term environmental ones; that REDD+ rules adversely interact with state and customary institutions; and that REDD+ lacks local legitimacy by excluding non-elites.

These different, partly contradicting conclusions can, in our view, be particularly attributed to the nature of this special issue: namely, that we invited scholars applying different interpretations and methods of performance assessment to contribute. Some of approaches are more critical than others towards policy evaluations in general and REDD+ evaluations in particular, for example, the 'staging performance' and 'performativity' approaches. It is thus no wonder that these come up with less favorable assessments of REDD+ performance; this can be attributed to the nature of these approaches. What we also see, however, is that mainstream performance evaluation methodologies also result in different outcomes; for example, economic versus public administration evaluations, due to data and assessment choices, as well as due to the different cases evaluated. Moreover, the papers highlight that the subject of performance itself is understudied: it is a difficult beast to measure, and as a research topic, is subject to selective narratives, values, and interests. The case studies in these papers also reflect the challenges of understanding, defining, and measuring performance, so the publication serves wider societal interests rather than selected ones.

Finally, REDD+ is still in an early phase of implementation, and one cannot expect its performance—the delivering of its perceived potential—to have fully materialized yet. Experiences of policy evaluations also highlight that we need to be realistic in our expectation that policies have not only positive, but also negative, direct and indirect, and intended and unintended, effects. In addition, we can neither expect that all policy evaluation traditions and approaches produce similar outcomes, nor that their conclusions will 'automatically' converge over time; that would be naïve. However, time is pressing, as impacts of REDD+ occur, whilst payments for results are being requested and issued. Therefore, we strongly encourage further REDD+ performance assessments and call for innovative yet rigorous analyses, and for comparative evaluations using different approaches to judge performance, in order to help develop our understanding of REDD+ performance.

Conflicts of Interest: The authors declare that they have no conflicts of interests.

References

1. Angelsen, A.; Brockhaus, M.; Sunderlin, W.D.; Verchot, L.V. (Eds.) *Analysing REDD+: Challenges and Choices*; Center for International Forestry Research (CIFOR): Bogor, Indonesia, 2012.
2. Den Besten, J.W.; Arts, B.J.M.; Verkooijen, P. The evolution of REDD+: An analysis of discursive-institutional dynamics. *Environ. Sci. Policy* **2014**, *35*, 40–48. [CrossRef]
3. International Database on REDD+ projects and programmes. Available online: http://www.reddprojectsdatabase.org/view/countries.php (accessed on 18 September 2019).
4. Corbera, E. Problematizing REDD+ as an experiment in payments for ecosystem services. *Curr. Opin. Environ. Sustain.* **2012**, *4*, 612–619. [CrossRef]
5. Angelsen, A. REDD+ as result-based aid: General lessons and bilateral agreements of Norway. *Rev. Dev. Econ.* **2017**, *21*, 237–264. [CrossRef]
6. Romijn, E.; Lantican, C.B.; Herold, M.; Lindquist, E.; Ochieng, R.; Wijaya, A.; Murdiyarso, D.; Verchot, L. Assessing change in national forest monitoring capacities of 99 tropical countries. *For. Ecol. Manag.* **2015**, *352*, 109–123. [CrossRef]
7. Angelsen, A.; Martius, C.; De Sy, V.; Duchelle, A.E.; Larson, A.M.; Thuy, P.T. REDD+ enters its second decade. In *Transforming REDD+: Lessons and New Directions*; Center for International Forestry Research (CIFOR): Bogor, Indonesia, 2018.
8. Poffenberger, M. Restoring and conserving Khasi forests: A community-based REDD strategy from northeast India. *Forests* **2015**, *6*, 4477–4494. [CrossRef]
9. Pandey, S.S.; Cockfield, G.; Maraseni, T.N. Assessing the roles of community forestry in climate change mitigation and adaptation: A case study from Nepal. *For. Ecol. Manag.* **2016**, *360*, 400–407. [CrossRef]
10. Bos, A.B.; Duchelle, A.E.; Angelsen, A.; Avitabile, V.; Sy, V.D.; Herold, M.; Joseph, S.; Sassi, C.; Sills, E.O.; Sunderlin, W.D.; et al. Comparing methods for assessing the effectiveness of subnational REDD+ initiatives. *Environ. Res. Lett.* **2017**, *12*, 074007. [CrossRef]
11. Börner, J.; Wunder, S.; Reimer, F.; Kim Bakkegaard, R.; Viana, V.; Tezza, J.; Pinto, T.; Lima, L.; Marostica, S. *Promoting Forest Stewardship in the Bolsa Floresta Programme: Local Livelihood Strategies and Preliminary Impacts*; Center for International Forestry Research (CIFOR): Bogor, Indonesia; Fundação Amazonas Sustentável (FAS): Rio de Janeiro, Brazil; Zentrum für Entwicklungsforschung (ZEF): Manaus, Brazil; University of Bonn: Bonn, Germany, 2013.
12. Duchelle, A.E.; de Sassi, C.; Jagger, P.; Cromberg, M.; Larson, A.M.; Sunderlin, W.D.; Atmadja, S.S.; Resosudarmo, I.A.P.; Pratama, C.D. Balancing carrots and sticks in REDD+: Implications for social safeguards. *Ecol. Soc.* **2017**, *22*. [CrossRef]
13. Simonet, G.; Bos, A.B.; Duchelle, A.E.; Resosudarmo, I.A.P.; Subervie, J.; Wunder, S. Forests and carbon: The impacts of local REDD+ initiatives. In *Transforming REDD+: Lessons and New Directions*; Center for International Forestry Research (CIFOR): Bogor, Indonesia, 2018.
14. Curtis, P.G.; Slay, C.M.; Harris, N.L.; Tyukavina, A.; Hansen, M.C. Classifying drivers of global forest loss. *Science* **2018**, *361*, 1108–1111. [CrossRef]
15. Pendrill, F.; Persson, U.M.; Godar, J.; Kastner, T.; Moran, D.; Schmidt, S.; Wood, R. Agricultural and forestry trade drives large share of tropical deforestation emissions. *Glob. Environ. Chang.* **2019**, *56*, 1–10. [CrossRef]
16. Brockhaus, M.; Korhonen-Kurki, K.; Sehring, J.; Di Gregorio, M.; Assembe-Mvondo, S.; Babon, A.; Sitoe, A. REDD+, transformational change and the promise of performance-based payments: A qualitative comparative analysis. *Clim. Policy* **2017**, *17*, 708–730. [CrossRef]
17. Milne, S.; Mahanty, S.; To, P.; Dressler, W.; Kanowski, P.; Thavat, M. Learning from 'Actually Existing'REDD+ A Synthesis of Ethnographic Findings. *Conserv. Soc.* **2019**, *17*, 84–95.
18. Luttrell, C.; Sills, E.; Aryani, R.; Ekaputri, A.D.; Evinke, M.F. Beyond opportunity costs: Who bears the implementation costs of reducing emissions from deforestation and degradation? *Mitig. Adapt. Strateg. Glob. Chang.* **2018**, *23*, 291–310. [CrossRef] [PubMed]
19. Ravikumar, A.; Larson, A.M.; Duchelle, A.E.; Myers, R.; Tovar, J.G. Multilevel governance challenges in transitioning towards a national approach for REDD+ evidence from 23 subnational REDD+ initiatives. *Int. J. Commons* **2015**, *9*, 909–931. [CrossRef]

20. Fletcher, R.; Dressler, W.; Büscher, B.; Anderson, Z.R. Questioning REDD+ and the future of market-based conservation. *Conserv. Biol.* **2016**, *30*, 673–675. [CrossRef] [PubMed]
21. Angelsen, A.; Brockhaus, M.; Duchelle, A.E.; Larson, A.M.; Martius, C.; Sunderlin, W.D.; Verchot, L.V.; Wong, G.; Wunder, S. Learning from REDD+: A response to Fletcher et al. *Conserv. Biol.* **2017**, *3*, 718–720. [CrossRef] [PubMed]
22. Wong, G.Y.; Luttrell, C.; Loft, L.; Yang, A.; Pham, T.T.; Naito, D.; Brockhaus, M. Narratives in REDD+ benefit sharing: Examining evidence within and beyond the forest sector. *Clim. Policy* **2019**, *19*, 1038–1051. [CrossRef]
23. Ramos, T.B.; Alves, I.; Subtil, R.; de Melo, J.J. Environmental performance policy indicators for the public sector: The case of the defence sector. *J. Environ. Manag.* **2007**, *82*, 410–432. [CrossRef]
24. Crabb, A.; Leroy, P. *The Handbook of Environmental Policy Evaluation*; Taylor and Francis Group: Routledge, London, 2012.
25. Arts, B.; Behagel, J.; Turnhout, E.; de Koning, J.; van Bommel, S. A practice based approach to forest governance. *For. Policy Econ.* **2014**, *49*, 4–11. [CrossRef]
26. Ton, G. The mixing of methods: A three-step process for improving rigour in impact evaluations. *Evaluation* **2012**, *18*, 5–25. [CrossRef]
27. Bamberger, M. Introduction to mixed methods in impact evaluation. *Impact Eval. Notes* **2012**, *3*, 1–38.
28. OECD. *Principles for Evaluation of Development Assistance D.A. Committee*; OECD: Paris, France, 1991.
29. Angelsen, A.; Brockhaus, M.; Kanninen, M.; Sills, E.; Sunderlin, W.D.; Wertz-Kanounnikoff, S. (Eds.) *Realising REDD+: National Strategy and Policy Options*; Center for International Forestry Research (CIFOR): Bogor, Indonesia, 2009.
30. Pasgaard, M.; Sun, Z.; Müller, D.; Mertz, O. Challenges and opportunities for REDD+: A reality check from perspectives of effectiveness, efficiency and equity. *Environ. Sci. Policy* **2016**, *63*, 161–169. [CrossRef]
31. Börner, J.; Thales, A.P.W.; Blackman, A.; Miteva, D.A.; Sims, K.R.E.; Wunder, S. National and subnational forest conservation policies What works, what doesn't. In *Transforming REDD+: Lessons and New Directions*; Center for International Forestry Research (CIFOR): Bogor, Indonesia, 2018.
32. Correa, J.; van der Hoff, R.; Rajão, R. Amazon Fund 10 Years Later: Lessons from the World's Largest REDD+ Program. *Forests* **2019**, *10*, 272. [CrossRef]
33. Samndong, R.A.; Vatn, A. Competing Tenures: Implications for REDD+ in the Democratic Republic of Congo. *Forests* **2018**, *9*, 662. [CrossRef]
34. Umunay, P.; Lujan, B.; Meyer, C.; Cobián, J. Trifecta of Success for Reducing Commodity-Driven Deforestation: Assessing the Intersection of REDD+ Programs, Jurisdictional Approaches, and Private Sector Commitments. *Forests* **2018**, *9*, 609. [CrossRef]
35. Overman, H.; Butt, N.; Cummings, A.R.; Luzar, J.B.; Fragoso, J.M.V. National REDD+ Implications for Tenured Indigenous Communities in Guyana, and Communities' Impact on Forest Carbon Stocks. *Forests* **2018**, *9*, 231. [CrossRef]
36. Nelissen, N. The administrative capacity of new types of governance. *Public Organ. Rev.* **2002**, *2*, 5–22. [CrossRef]
37. Milbank, C.; Coomes, D.; Vira, B. Assessing the Progress of REDD+ Projects towards the Sustainable Development Goals. *Forests* **2018**, *9*, 589. [CrossRef]
38. Weatherley-Singh, J.; Gupta, A. Embodied Deforestation as a New EU Policy Debate to Tackle Tropical Forest Loss: Assessing Implications for REDD+ Performance. *Forests* **2018**, *9*, 751. [CrossRef]
39. Vincent, J.R. Impact evaluation of forest conservation programs: Benefit-cost analysis, without the economics. *Environ. Resour. Econ.* **2016**, *63*, 395–408. [CrossRef]
40. Easton, D. An approach to the analysis of political systems. *World Politics* **1957**, *9*, 383–400. [CrossRef]
41. Gertler, P.J.; Martinez, S.; Premand, P.; Rawlings, L.B.; Vermeersch, C.M. *Impact Evaluation in Practice*; The World Bank: Washington, DC, USA, 2016.
42. Rosa da Conceição, H.; Börner, J.; Wunder, S. REDD+ as a Public Policy Dilemma: Understanding Conflict and Cooperation in the Design of Conservation Incentives. *Forests* **2018**, *9*, 725. [CrossRef]
43. Duchelle, A.E.; Herold, M.; de Sassi, C. Monitoring REDD+ impacts: Cross scale coordination and interdisciplinary integration. In *Sustainability Indicators in Practice*; De Gruyter: Berlin, Germany, 2015; pp. 55–79.

44. Bayrak, M.; Marafa, L. Ten years of REDD+: A critical review of the impact of REDD+ on forest-dependent communities. *Sustainability* **2016**, *8*, 620. [CrossRef]
45. Krause, T.; Nielsen, T.D. The legitimacy of incentive-based conservation and a critical account of social safeguards. *Environ. Sci. Policy* **2014**, *41*, 44–51. [CrossRef]
46. Mosse, D. *Cultivating Development: An Ethnography of Aid Policy and Practice (Anthropology, Culture and Society)*; Pluto Press: London, UK, 2005.
47. UN-REDD. The Democratic Republic of the Congo. Available online: https://www.unredd.net/regions-and-countries/africa/democratic-republic-of-the-congo-the.html (accessed on 30 April 2019).
48. Ball, S.J. The teacher's soul and the terrors of performativity. *J. Educ. Policy* **2003**, *2*, 215–228. [CrossRef]
49. Skutsch, M.; Turnhout, E. How REDD+ Is Performing Communities. *Forests* **2018**, *9*, 638. [CrossRef]
50. Den Besten, J.W.; Arts, B.; Behagel, J. Spiders in the Web: Understanding the Evolution of REDD+ in Southwest Ghana. *Forests* **2019**, *10*, 117. [CrossRef]

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National REDD+ Implications for Tenured Indigenous Communities in Guyana, and Communities' Impact on Forest Carbon Stocks

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Received: 15 February 2018; Accepted: 25 April 2018; Published: 27 April 2018

Abstract: Early project-level initiatives of 'reducing emissions from deforestation and forest degradation' (REDD+) have left a negative impression among many forest-dependent peoples (FDP) across the tropics. As countries move towards national-level implementation and results-based payments, it is timely to analyze the effects of 'national REDD+' on FDP. We use Guyana's technically approved United Nations Forest Reference Emission Level (FREL) submission and Opt-In Mechanism to assess how fifteen indigenous communities with tenured forestland may financially benefit from national REDD+, and evaluate whether, and to what extent, Guyana forms a best-case scenario. In addition, we provide a first-time assessment whether field estimates of the average carbon density of mature forests managed by fifteen forest-dependent communities (beyond rotational farming lands) equals that of nearby unmanaged mature forest, as this could affect REDD+ payment levels. We conclude that, notwithstanding some pending issues, Guyana's national REDD+ program could be very beneficial for FDP, even under a modest United States (US) $5 unit carbon price. We present economic evidence to support forest governance change domestically in sovereign developing countries that may ease FDP tenure and national REDD+ implementation. The average carbon density was locally substantially less in FDP-managed forest, but had little effect on the overall carbon stock of the titled forest area, and is considered modest when incorporating ecological and socioeconomic attributes. Partnerships with FDP when combined with advances in remote sensing could have potential for economic monitoring of forest emissions across the tropics.

Keywords: REDD+ financial benefits; indigenous carbon impact; land grabbing; tenure; social safeguards; forest carbon calibration

1. Introduction

Reducing Emissions from Deforestation and forest Degradation (REDD+) aims to reduce emissions from tropical forests while ensuring livelihoods of forest-dependent people (FDP) [1]. REDD+ was

explicitly mentioned as a mitigation option in the 2015 Paris Climate Accord, where most nations signed an agreement to keep global temperature rise below 2 °C [2], encouraging tropical forest countries to submit proposals for national REDD+ programs [3]. FDP inclusion in these processes, however, has been peripheral at best [4–6]. The term "forest-dependent peoples" (FDP) has been defined in various ways [7]. In the context of communities' impact on forest carbon stocks of indigenous lands, we define forest-dependent peoples as residents of communities that are spatially located within or in close proximity to forests, which have de jure or de facto user rights, and which depend significantly (though not necessarily exclusively) upon forests for residents' livelihood needs.

The involvement of FDP with REDD+ around the world thus far has ranged from problematic (e.g., [8]), to very negative [9,10], leading to a backlash from 'no-redd' civil and NGO movements (e.g., [11,12]). Reported challenges of REDD+ pilots or demonstration projects with FDP include lagging global finance for REDD+, tenure insecurity, non-mandatory forest safeguards [8], poor adherence to Free Prior Informed Consent (FPIC) principles, and prioritizing carbon credits over local interests [9,10]. Much of the REDD+ literature has converged on the belief that REDD+ cannot be implemented without first resolving FDP tenure, in order to prevent land grabbing, regulate FDP resource use restrictions, and ensure equitable REDD+ benefit sharing [13–16]. Although REDD+ is intended for implementation at the national level [3], all REDD+ experiences to date are based on sub-national initiatives [17], and there has been no assessment of the national implications for FDP.

Guyana was the first country to submit a comprehensive Forest Reference Emission Level (FREL) proposal to the United Nations Framework Convention on Climate Change (UNFCCC), which included countrywide forest emissions, forest degradation due to logging, and countrywide variation in the carbon density of its forests [18]. The submission was technically approved by the UN [19]. In addition to its FREL-submission, Guyana has developed an 'Opt-In Mechanism' for its indigenous communities. The Opt-In Mechanism provides indigenous villages with titled lands (documented legal ownership of the land, including forest, Section 2.1) the opportunity to use their forests as a part of the national REDD+ program [20] (detailed in Section 2.2). Guyana thus provides a first example and opportunity to examine the implications of national-level REDD+ for FDP, including its financial benefits. We subsequently explore to what extent Guyana forms a best-case scenario due to the carbon density of its forests, its High Forest Low Deforestation (HFLD) status, and FDP tenure.

FDP are regarded by many as the best forest stewards, based on observations that their lands retain most forest cover in comparison to other forest uses, including fully protected areas (e.g., [21–23]). However, this omits a core cause of deforestation and generally hesitant recognition of FDP forest rights, which is that commercial forest uses (CFU, e.g., agriculture, mineral, and wood extraction) provide revenue and add to a country's gross domestic product, while FDP use does not. Neither does 'FDP retaining most forest cover' imply that their forest (beyond rotational farming areas) retains the carbon content of mature forest, even if a closed canopy cover is present, as people may log for domestic or commercial purposes (labeled as 'forest degradation'). If their mature titled forests do hold significantly lower carbon stocks than unmanaged forests, this would have implications for levels of future carbon payments to FDP. To address this, we assess the impact of 15 FDP communities on surrounding mature forest in Guyana to determine the extent of their influence on forest carbon stocks. In this paper we combine data from Guyana's UN-FREL submission and Opt-In Mechanism with our field measurements and remote sensing data on titled forest areas to examine how Guyana's national REDD+ program would affect FDP and evaluate the wider applicability of these results.

2. Study Area and Methods

2.1. Indigenous People and Land Rights

In 2012, there were nearly 80,000 indigenous people of nine ethnicities in Guyana [24], making up 10.5% of the national population. Locally named 'Amerindians', the nine groups live in approximately 146 indigenous communities, 96 of which have titled lands [25], which collectively occupies

approximately 14% of the national forest area (2.6 M ha of 18.4 M ha, [26]). The first legal government commitment to provide Indigenous land rights in Guyana was rooted in the fact that, at the time of independence from British rule (1966), the Indigenous vote was important for the other two major ethnicities (African Guyanese and Indo-Guyanese) [25]. It has, however, taken four more decades, with the passage of the Amerindian Act [27], that there has been a systematic acceleration of indigenous communities gaining title to traditionally inhabited lands. Under the Act, Amerindian communities established at least 25 years and with more than 150 people can apply for title. The government subsequently has six months to visit the community to gather relevant information, and another six months for the Minister to make a decision, which, if the community disagrees, can be appealed in court [27] ('Part VI'). The title provides permanent full collective ownership of the land and its forest resources by the community, as protected by the Constitution, but does not include rivers and 20-m wide riverbanks. Belowground mineral resources remain state ownership, but a community ('village' when it has title) can deny access to (small and medium-scale) mining on its titled land [27] ('Part VI'). The titled land is owned equally by all residents of the community. While a household may occupy an area for generations and the wider village will accept and respect that piece of land as theirs, the household could not formally use this as an asset. Although rights to carbon stocks were not defined in the 2006 Act, the government has acknowledged these rights by giving communities with titled lands the choice of opting in or out of enrolling their forest in Guyana's national REDD program and to receive compensation from government under a REDD+ agreement (see Section 2.3) [20].

2.2. Guyana and REDD+

Guyana is classified as a High Forest-Low Deforestation (HFLD) country [28], with about 83.3% of its area being covered by forest (18.4 M ha, [26]). HFLD was coined in 2007 by Da Fonseca et al. [28] to denote a group of countries that were at risk of being omitted from a new framework for reducing emissions from deforestation—those with high forest cover (>50% of land area in 2005) and low rates of deforestation (below global average of 0.22% during 1990–2000) [28]. We return to HFLD in Section 4.3.2. The national population is around 750,000 and Guyana is ranked 151th in the world in terms of per capita gross domestic product [29]. The country has been at the forefront of REDD+ development since 2006, and it is a partner country of both the UN REDD+ Programme and the World Bank's Forest Carbon Partnership Facility [3,30]. In late 2009, Guyana signed a five-year bilateral performance-based REDD+ agreement with Norway to facilitate REDD+ readiness and implement low carbon projects [31,32].

2.3. Guyana's Opt-In Mechanism Strategy

Concurrent with its UNFCCC submission, Guyana developed an 'Opt-In Mechanism' that stipulates the conditions and benefits under which indigenous villages may be included in the national REDD+ scheme [20]. The Opt-In Mechanism (OIM) was developed in consultation with indigenous leaders nationwide that provided reviews to inform the documents, and is not yet finalized [20]. Opting in is the decision of individual villages: it is voluntary, reversible, and without a deadline or consequences for other national development programs. If, after due Free Prior Informed Consent (FPIC) villages decide to opt in, traditional activities, including swidden farming, are permitted to continue. Emissions of village activities will be monitored, and the difference with the national reference level will be used to determine the amount of payment each year per village (see below). Transaction and implementation costs would be shared between government and village. Chiefly, the government provides one-off initial support to villages for the OIM to become operational, while subsequent running and monitoring costs would be covered by the village's REDD+ earnings [20]. REDD+ revenues will not translate into direct payments to the village or its households, but are to be used to finance projects that are included in the Village Plan. This plan is updated annually and outlines the village's vision for development, including the management of forest resources [27].

Levels of annual payments to each village will be calculated in a similar way as at the national level [18]. At the national level, the annual emission rate and the forest area of the country is used to calculate payments, and these variables will be replaced by the annual emission rate of the individual village and the carbon stock of its titled forest [20]. Consequently, a village's REDD+ revenue will be calculated as:

$$\text{Annual revenue} = (\text{National Reference Emission Level} - \text{Community Emission Level in } \text{Yr}_x) \times \text{Community's forest } CO_2 \text{ stock in } \text{Yr}_{x-1} \times \text{Carbon price} \quad (1)$$

The national reference emission level is based on the 12-year average of countrywide forest emissions from deforestation and forest degradation during 2001–2012, expressed as a percentage of the country's total carbon stock, in carbon dioxide, CO_2, equivalents [18]. As a simplified example, a country with a 1,000,000 ha forest area, with a 'carbon density' of 200 tC ha^{-1}, has a national 'carbon stock' of 200 million tC, or 733 Mt in CO_2 equivalents (the conversion factor C—CO_2 is 44/12 = 3.667, based on the atomic weights of carbon (12) and oxygen (16)). If the country deforested on average 3000 ha per year in recent history (3000 × 200 × 3.67 = 2.2 Mt CO_2), its 'historical emission rate' is 0.3% (2.2/733). Any forest degradation, e.g., through logging, would similarly have to be converted to CO_2-equivalents, and added to the 2.2 MtCO_2 from deforestation [18]. The annual community emissions are similarly expressed as a percentage of the total carbon stock of the community's titled forest. The difference between the reference level and the community's emission rate in a given year represents the rate at which the community has avoided emissions as compared to the national baseline rate. This is multiplied by the total forest carbon stock of the village's titled forest (in tCO_2) in the year prior to the assessment, and by the carbon price (US$ per tCO_2), to arrive at the amount of revenue earned that year (Equation (1)). Section 3.1 provides an elaborated example.

Equation (1) shows there are two variables under influence of the communities; how much carbon they emit each year ('Community Emission Level', CEL), and how much carbon they have on their titled land ('Community' forest CO_2 stock', CFS). Guyana is still developing the methodology to monitor annual community emissions, and is test-casing which emission sources to include by balancing significance versus monitoring cost [26]. Since forest clearance for rotational farming or shifting cultivation forms no 'permanent conversion from forest to non-forest use' (it is left to regrow after some years of crop cultivation), Guyana does not categorize this as deforestation but as forest degradation, for which emission factors are being developed [26]. In the absence of numbers on annual community emissions, we enter low and high emission rates for CEL in Equation (1) to obtain the range of REDD+ revenue the average village could expect if it opts in to the national REDD+ program.

Our field-assessment of the average carbon density of titled community forest could affect the variable CFS, if found significantly different from the government's preliminary estimate of 283.7 tC ha^{-1} (above + belowground carbon) for this region [18,33], and thereby the level of annual REDD+ payment (Equation (1)). Guyana has thus far used the interim carbon price set by Brazil's Amazon Fund (US$5 per t$CO_2$, [31]). We utilize the same carbon price in our analysis, and evaluate carbon price trends in the Discussion section.

2.4. Study Sites

The carbon assessment of mature forests that were used by FDP, and of unused 'control' forests, formed part of a larger study of human-wildlife dynamics in the context of socio-economic change, and the feasibility of large-scale environmental monitoring by FDP ('Project Fauna', 2007–2011, [34]). The assessment took place in Guyana's Region 9, also known as The Rupununi, an area that is covering approximately 48,000 km^2 of both the Amazon and Essequibo watersheds in southwest Guyana (Figure 1).

Figure 1. Study area with savannah and forest cover, indigenous titled lands, and village and control transects where biomass was estimated.

The Rupununi consists of a mostly flat-to-undulating landscape (~150 m above sea level, with mountain peaks up to 1000 masl) of tropical forest with defined boundaries to natural grassland savannah with scattered stunted trees, interspersed with small forest 'islands', and *Mauritia flexuosa* L.f. palms along creeks (more details in [34,35]).

Approximately 40 communities are scattered across the study area, ranging in population from around 60 to 1200, and predominantly located in lowland savanna close (<5 km) to the forest edge [34,35]. Nearly all the residents of the 15 villages that were included in this biomass study self-identified as being indigenous (predominantly Wapichan and Makushi). The people rely on their forests for swidden agriculture, building materials, small canoes, charcoal for clay brickmaking, firewood (typically slash

from farms or dead wood in nearby forest), non-timber forest products (NTFP), and medicines [36]. Community-based forest management exists, but it is not well documented. In this sense it is more informal and based on tradition rather than law. Major forest management decisions, such as timber extraction and negotiation with the government and mining companies, are undertaken at the village and district levels (representing the North, South Central, and South Rupununi districts). Smaller-scale forest management and utilization, including most hunting and foraging activities, as well as small scale timber extraction, occur at the household level. For the purposes of this paper, we assume the community has made collective decisions over what kinds of activities are allowed across their lands.

2.5. Community REDD+ Revenue

Since annual emissions of individual villages were not available at the time of this study, we entered low and high village emission rates for the variable 'Community Emission Level' in Equation (1) to obtain the range of REDD+ revenue the average village could expect. We used 'no emissions' as the hypothetical lowest rate (generating highest revenue), and '0.1%' as the highest rate. The latter rate was the maximum rate under the 2010–2015 Guyana-Norway agreement [31]. Under this agreement Guyana self-imposed a cap of 0.1% (instead of its reference level 0.242% [18]) to show its commitment to mitigating climate change, beyond which it would receive no revenue [31]. The UNFCCC threshold was still under discussion at the time of Guyana's UN-submission [18]. As a further example, we present the revenue level when a community emits at the same rate as the national historical rate (0.049%, [18]).

In accordance with Project Fauna's agreement with partner villages (to protect the anonymity of specific villages), here we provide mean regional results. Project Fauna has informed the individual villages of the size of their forest area and total standing carbon stock, to allow for calculating the revenue range of their specific village, an essential yet so far lacking piece of information for indigenous villages to make an informed decision (in line with the principles of FPIC) whether or not to join REDD+ (Overman and Fragoso, unpublished data).

2.6. Assessments of Carbon Stocks and Titled Forest Areas

Local indigenous technicians received three days of classroom and field training to assess biomass in mature forest plots (i.e., excluding successional forests recovering from rotational farming) that were located between 0 and 12 km around 15 villages, and at five control areas that were reported to be free of any human activities, at least in the recent past, as confirmed by subsequent onsite technician observations ('undisturbed', 15–40 km away from any village, Figure 1). Biomass plots in mature forest were selected in a stratified random way, by making use of previously established transects for the larger 'Project Fauna' study on human-wildlife dynamics. These transects had been inventoried for vegetation types by trained local technicians, which allowed for selecting mature forest for the biomass plots (for more details see [37]). Transect arrays around each village had been divided in two concentric zones, 'near' (0–6 km from village center) and 'far' (6–12 km), with four transects, each 4 km in length, within each zone [34]. Start point and bearing of the straight-line transects were randomly generated, but placement was stratified by a minimum of 3 km distance between adjacent transects. The 6 km boundary was selected as evidence has shown that most hunting activity, and thus most walking activity in forest occurs within 5 km of villages, while the 6–12 km zone was established to determine source-sink dynamics of hunted wildlife [35]. These forest zones were used to group plots and obtain average biomass per zone (0–6 km, 6–12 km and 15–40 km (controls) from village centers).

Aboveground biomass of forests was estimated by the local technicians for trees $\geq$10 cm diameter at breast height (dbh) in 564 plots of 10 m $\times$ 10 m on 111 transects (5.64 hectares, Figure 1), using the regression equation for moist tropical forest of IPCC [38], multiplied by 0.5 to derive above ground carbon densities. More details on the methodology, including the verification of technician estimates, can be found in [37]. A total of 386 plots were located in the 0–12 km village zone, and 178 plots in control areas. Above ground carbon stocks data for undisturbed plots and plots located within 0–12 km

of a village center were compared statistically (ANOVA) after the data were log transformed using the stats package in R [39]. Areas of forest within titled lands were derived from Landsat imagery and raster counts of 30 × 30 m pixels in ArcGIS. The computation of forest areas did not allow for distinction between mature and secondary forests [37]. This constitutes a risk for overestimating carbon stocks from forest cover of titled areas, which is discussed in Section 4.2.

3. Results

3.1. Community REDD+ Revenue

Based on Equation (1) and the reported (above and belowground) carbon density for this region, 283.7 tC ha^{-1} [18,33], payment for the average village would fluctuate between US$166,000 and $284,000 per year, depending on the community's emissions each year (Table 1). The $166,000, for example, is given by: (0.00242 − 0.00100) × 22,544 ha × 283.7 tC ha^{-1} × (44/12) × $5 (Equation (1)), where 0.00242 represents the national reference emission level (0.242%, [18]), 0.00100 is a hypothetical community emission level (0.1%), 22,544 ha is the area of titled forest for the average community, 283.7 tC ha^{-1} is the mean carbon density [18,33], (44/12) represents the conversion factor from C to CO_2, and $5 represents the carbon price.

Table 1. Gross annual Reducing Emissions from Deforestation and forest Degradation (REDD+) revenue for the average indigenous community (n = 15) and household equivalent under different emission scenarios vs. current household income.

Emission Scenario	Emission Rate	Annual Revenue (US$)	
		Average Community (22,544 ha Titled Forest, se. 2414)	Per Household (Mean 80, se. 13.3)
National historical rate (2001–2012)	0.049%	226,300	2830
Maximum rate (beyond which payments may stop [a])	0.100%	166,500	2080
No emissions	0.000%	283,750	3550
Mean annual household cash income estimates [b]			300–600
Costs of clear-felling 1 ha intact forest [c]		5201	54

[a] Under the 2010–2015 Guyana-Norway agreement, Guyana self-imposed a cap of 0.1% (instead of its reference level 0.242%, [18]) to show its commitment to mitigating climate change, beyond which it would receive no revenue [31]. The UNFCCC threshold was still under discussion at the time of Guyana's UN-submission [18]. [b] Based on two earlier estimates [40,41]. A recent estimate of $3079 [42] is considered a marked overestimation and disregarded [43], authors' comms. with village leaders. [c] Above and belowground live biomass, 283.7 tC ha^{-1} [18,33], times (44/12), times $5. ('44/12' is the conversion factor from C to CO_2 based on atomic weights: C = 12, and O = 16).

The range in gross REDD+ income for the average community (with 80 households) would equate to between ~$2100 and $3500 per household per year. In comparison, available estimates of household cash income were $300–600 per year (Table 1), while the minimum wage in Guyana was ~$2600 per year in 2017 [44].

3.2. Community Carbon Impact

The aboveground living biomass component of mature forests without human activity in the region ('Undisturbed', 15–40 km away from any village) contained an average 172.4 Mg (mega gram, or metric ton) carbon per hectare (se (standard error) = 15.9, n = 178 plots, Figure 2, see also [37]).

Mature forests within a 12 km radius of the villages contained on average 17% less carbon per hectare than Undisturbed forest (143.6 tC ha^{-1}, se = 10.8, n = 386 plots, p-value = 0.002). Further analysis revealed that the carbon impact is restricted to within a 6 km radius from villages, since the mean carbon density of forests that were located 6–12 km from village centers was statistically not different from that of more distant Undisturbed forest (170.5 vs. 172.4 tC ha^{-1}, se = 15.9, n = 228 plots, p = 0.111). The mature forests within 0–6 km from villages contained an average 39% less carbon than Undisturbed forests (104.8 tC ha^{-1}, se = 9.4, n = 158 plots, $p < 0.001$).

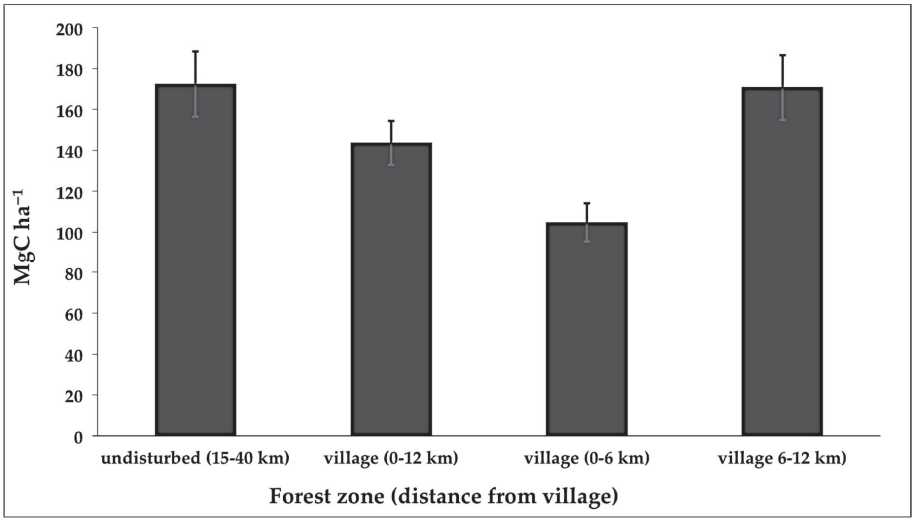

Figure 2. Estimates of mean aboveground carbon density in forests without human activities ('undisturbed'), compared to mature forests around 15 indigenous villages in southern Guyana.

Landsat imagery analysis [37] revealed that, on average, 19.3% of communities' titled forest area was located within 6 km of the village (including an unknown area of fallow forest), implying that at least 80.7% of indigenous titled forest areas had no measurable difference in stored carbon when compared to undisturbed forests. This means that the indigenous titled forests in the Rupununi contained on average at most 7.5% less carbon than forests untouched by people (39% × 19.3%). If, for example, half of the 19.3% was fallow forest, then the mature titled forest contained on average 3.76% less carbon than nearby forest untouched by people.

4. Discussion

4.1. Indigenous Impacts on Forests

To our knowledge for the first time, we provided an estimate of the average impact that 15 indigenous communities appear to have had over time on carbon stocks of adjacent mature forests beyond fallow areas. The average 39% lower carbon density of the 0-6km forest zone appears high, as it implies that more than a third of the biomass has been extracted from every hectare of mature forest within 6 km of village centers (i.e., beyond savanna and rotational farming areas). However, as mentioned, this impact is confined to less than ~20% of the titled forest area, which dilutes the overall impact on the titled forest to less than 7.5%. In addition, apart from larger sample sizes improving the accuracy, there may be potential selection bias around the choice of the 6 km boundary zone used to differentiate levels of forest use and related carbon stocks. It should also be realized that 39% of the biomass in tropical forest may be contained in just the 15 biggest trees per hectare [45], and that chainsaw logging has an inherent overall efficiency of only 5–12% (i.e., for every board produced, the equivalent of 8–19 more boards go up in CO_2, [46–48], details in Supplementary Materials (Note S1)). There may have been several other factors of unknown magnitude that can have influenced results, such as possibly lower carbon density in natural forests bordering on savanna, cases where neighboring non-sampled communities use the same forest area, et cetera. Given these factors, the observed difference in carbon density appears modest for, on average, 75 year-old communities with 80+ households, the majority of whom are fully dependent on forests for their livelihoods (more details in Supplementary Materials (Note S1)). In sum, while the 39% difference was found to be statistically significant ($p < 0.001$), it appears confined to a

small area which reduces the overall carbon stock of titled mature forest areas only slightly (below 7.5%) compared to nearby forest untouched by people, which may be negligable for carbon payments under REDD+.

4.1.1. Carbon Density of Southern Guyana Forest

The preliminary mean aboveground carbon density reported by the government for the study area (229.7 tC ha^{-1}, [18,33]) was not supported by our study (172.4 tC ha^{-1} for Undisturbed forest, Figure 2), even after adding carbon from 5–10 cm dbh trees (4.4 tC ha^{-1}, adopted from [45]), which we omitted: 176.8 tC ha^{-1}. The difference is about a quarter less carbon per hectare (23%), which would imply 23% less revenue for indigenous communities in this region ('Community's forest CO_2 stock', Equation (1)). The observed lower carbon density of Undisturbed forest in the region is corroborated by another biomass assessment across the North Rupununi that used the same methodology as the GoG (166 tC ha^{-1}, [49]), as well as by earlier assessments of the forests in southern Guyana [50]. Future government-planned biomass estimations in southern Guyana will reveal whether thusfar reported carbon densities for this region need adjustment.

4.1.2. Economic Pantropical Monitoring of Forest Emissions

Our Project Fauna study [34,37,51], and several others, e.g., [52–58], have shown that with short training periods, FDP can acquire the skills to estimate biomass, follow systematic work plans, handle GPS units, smartphones, and unmanned aerial vehicles (UAV, or drones) in the field, with similar accuracy as professionals at much lower costs. This supports the suggestion in the literature that more ground derived biomass data are needed from tropical forests to improve calibration of remote sensing (RS) estimates for different forest types, which has been hampered by field costs e.g., [59–63]. We describe how teams of local people with third-party verifiers could economically provide such data. A further 6–12 fold field cost reduction may be possible if forest carbon densities are derived from measuring only plot trees over 30 cm, or 20 cm, in diameter (approximately 83, resp. 155 trees per hectare, containing 75% resp. 85% of the carbon, instead of measuring all trees over 5 cm (~1000 per ha) [45]).

Once the RS signatures of the different forest types are ground-calibrated, maps can be created that more accurately describe the carbon density variation across tropical forests. This will improve the accuracy of calculating emissions from satellite-detected areas of deforestation across forest basins. When combined with rapid advances in RS technology (in both image data fusion and resolution e.g., [61,64–68]) and tree gap emission factors [48,69], this could have potential for economic monitoring of forest degradation emissions from logging across the tropics, remotely and objectively. Since global logging emissions are significant [69], this aids the credibility and feasibility of the REDD+ mechanism for climate change mitigation. Accurate countrywide monitoring of emissions by each forest concession holder (e.g., registered mining and logging concessions, FDP titled forest) would also contribute to transparent and equitable sharing of burdens and benefits of REDD+ among forest stakeholders.

4.2. National REDD+ and FDP

We found that Guyana's approach towards implementing REDD+ nationally would produce a large financial benefit to FDP, equating to a 3.5–12 fold increase in cash income for the majority of households (Table 1). REDD+ would not only form a significant source of revenue, but has the potential to provide a stable revenue source, for all of the country's indigenous communities with titled forest, independent of what other communities decide or emit, with funds to be allocated to self-identified development priorities.

We underline that these are gross revenue estimates from which, as yet unfinalized [20], REDD+ costs due by the village will be subtracted (Section 2.3), which could be significant. While not entirely overlapping with apparent communities' costs in Guyana, a recent review of studies estimating different REDD+ costs found 'transaction and implementation' costs averaging US$ 3.39 tCO_2^{-1} (range

$0.03–$20.93) [70]. None of the 60 studies however, analysed REDD+ costs at the national (country) level (but used a 'local empirical, global empirical, or global simulation' approach), and the authors warned that available estimates were inadequate, suggesting an important gap in the literature [70]. We further note that REDD+'s high benefit is in large part due to extremely low current FDP levels of cash income ($300–600 yr^{-1}), and that several policy issues still remain to be resolved in Guyana (see Supplementary Materials (Note S2)). Also, our REDD+ revenue figures will be slightly overestimated since our satellite imagery was unable to distinguish secondary from mature forest, implying that all of the forest cover in titled areas was regarded as mature forest in calculations of communities' forest carbon stock. Recovering forest after swidden agriculture is, however, on average, a small proportion of total titled forest cover [26].

4.3. How Exceptional Is Guyana?

The beneficial nature of Guyana's national REDD+ program for FDP is in distinct contrast to FDP experiences with many earlier REDD+ projects in other countries e.g., [8,17]. One reason is that Guyana's, UN-approved, national REDD+ mechanism functions quite differently from REDD+ at the project level. For instance, national REDD+ is not subject to the structural difficulties of REDD+ projects (setting reference levels, national leakage, permanence [17]), since each country develops its reference level based on historical countrywide forest emissions, which serves as the baseline of normal emissions, per year. Any subsequent annual emissions below this base level reflect active reductions, and are traded as carbon credits [18,71]. Guyana does, however, appear to have three advantages over many other developing countries, which contribute to the level of positive outcomes of national REDD+ for FDP: comparatively high forest carbon density, HFLD status, and secure FDP tenure. We discuss these below.

4.3.1. Carbon Density

The reported average carbon density of Guyana's forests (283.7 tC ha^{-1}, [18]) is almost twice as high as the densities that were reported by other Amazon countries (Brazil, Colombia, Ecuador, [3]), implying twice less revenue per avoided hectare of deforestation in these latter countries. High carbon densities in Guiana Shield forests are consistent with research e.g., [72], although Guyana's reported value for the south part of the country may need some downward adjustment in update reports to the UN (Section 4.1.1). Further, if carbon prices rise, due to the urgency of global emission reductions (e.g., to $40–80 $tCO_2{}^{-1}$ by 2020, [73,74]), such price increases would more than compensate lower carbon density forests in other countries.

4.3.2. High Forest Low Deforestation (HFLD)

Global REDD+ models aim to provide financial incentives to all tropical forest nations to join REDD+ to avoid international leakage of forest emissions [71,75]. However, if payments were only based on emission reductions, developing countries with historically low forest emission rates (HFLD countries) would have little incentive to join REDD+. Instead, they could be persuaded to accept offers from forest based industries that come under pressure in other REDD+ countries to operate in their (HFLD) forest, resulting in not a reduction, but a relocation or 'leakage' of emissions, thus invalidating REDD+ credits of the non-HFLD country [71]. In Guyana's technically approved FREL submission to the UN [18,19], the Combined Incentive approach of Strassburg et al. [71] is adopted to develop a payment model. This model raises the reference level of HFLD countries as Guyana above their historical rate [18], which can result in substantial annual REDD+ payments at *current* emission rates [76]. These funds would enable Guyana to reward its FDP for emissions below the national reference level, instead of demanding resource use restrictions for ('result-based') payments. However, an argument should be made in favor of FDP as responsible forest users. Contrary to some perceptions, FDP have been shown to be a minor contributor to countries' total forest emissions, not only in Guyana but also across continents [26,77–79]. We argue FDP would be an even smaller

'emission driver' (source of emissions) if emissions were not expressed per driver but per household. To illustrate, the average household working in the overall mining and logging sectors in Guyana emits 41, respectively, 20 times more CO_2 from forest per year than the average FDP household (1% of the country's total forest emissions is emitted by 11,000 FDP households, while 91% of the total is emitted by 23,000 jobs, i.e. households, in the overall wood sector and 13,000 jobs in mining [18,26,29,80,81]). The low emission lifestyle of FDP, for generations, indicates there is very little potential for emission reductions, i.e., results-based payments, with this driver, which would directly affect their livelihoods, and hence breach the minimal 'no harm' REDD+ Safeguard. Instead, it strongly supports the notion that FDP should benefit from REDD+ well beyond 'no harm', with establishment of solid and objective FDP safeguards, i.e., containing a 'monitoring, reporting and verification' aspect.

By contrast, there would be much more potential gain for the country in reducing the emissions of commercial forest uses (91% of total in Guyana [18]), which was recently found to generate large overall net profit along private supply chains, shared ~99:1 with the resource-owning country [76]). Commercial forest use (CFU) emissions may be reduced by 'cleaning supply chains' and moving commodity production out of primary forest e.g., [82,83], and by 'cleaning profit chains' to fund better forest management [76].

4.3.3. FDP Tenure

In the context of REDD+, settling FDP tenure rights has been described as an essential requisite before REDD+ implementation, so as to avoid land grabbing, regulate FDP resource use restrictions, and enable equitable REDD+ benefit sharing with FDP [13–16]. An assessment of Guyana's UN-approved FREL submission [76], however, indicated that land grabbing appears unlikely to occur under national REDD+ because owning or acquiring standing forest would yield virtually no annual forest rent, whereas logging or clearing standing forest will substantially cost the owner, if not the state (see below). In addition, the frequently stated sequestration capacity of standing forest does not pass REDD+'s additionality criterion (i.e., the CO_2 removal or reduction would not have happened without human effort/intervention). As such, the sequestration of standing forest is unlikely to generate credits, while sequestration credits from re/afforestation or enhanced regeneration with native species are small per hectare when compared to credits of avoided deforestation and degradation (between \$9–101 ha^{-1} yr^{-1} at a \$5 carbon price [84,85]).

Further, while CFUs are often hailed in terms of progress, employment, or national development, actual net revenue for a developing country can be quite small, e.g., \$13 and 0.5 jobs per hectare for selective logging, and \$4100 gross and 2.8 jobs per hectare for alluvial gold mining in Guyana, while costing \$560, respectively, \$5200 per hectare in foregone REDD+ revenue at \$5 $tCO_2{}^{-1}$ [76]. Such figures make it harder for governments to grant commercial concessions on FDP lands, given that CFUs are typically associated with large and long-term social and environmental disruption for hundreds of citizens in FDP communities e.g., [86].

Lastly, higher carbon prices, such as the \$40–80 required by 2020 stated by [73,74], may in fact generate tenure security, when lost REDD+ income from commercial forest damage becomes economically inhibitive for tropical forest nations (e.g., \$41,000–83,000 ha^{-1} to deforest, and \$4500–9000 to log a 284 tC ha^{-1} forest [71,76]).

Economic considerations and assessments in the context of national REDD+, as presented here and in concurrent work [76], may provide domestic leverage for forest governance change beneficial to FDP, since economic aspects often reflect the reality behind land use in the tropics [87]. Public general awareness of the economics of current forest governance may aid government and electorate decision-making in sovereign developing countries in a national REDD+ era, which would in all likelihood be beneficial for FDP livelihoods.

5. Conclusions

In contrast to many project-level experiences, our analysis shows that REDD+ implemented nationally in Guyana could have large annual financial benefits for FDP with legal forest tenure, equivalent to 3.5–12 fold increases in cash income for the majority of housholds. While legal forest tenure is not common for many FDP in the tropics, and Guyana has some additional comparative advantages (high forest carbon density, HFLD), we suggest that these advantages do not appear to be essential for national REDD+ to have positive outcomes for FDP in other countries. Concurrent work [76] suggests how policy can eliminate incentives to land grabbing, which is perceived to be a main argument for FDP tenure. Restrictions on FDP resource use would also appear to be unlikely as FDP emit little when compared to commercial forest emissions, and such restrictions would directly breach UN social safeguard obligations. These and other presented lines of economic evidence (e.g., modest net per hectare state benefits from CFU, extremely skewed private-public sharing of net revenue on forest-based resources, inhibitive forest damage costs at rising carbon prices, REDD+'s competitiveness with CFUs at \$5 $tCO_2{}^{-1}$ [76]), may motivate forest governance change domestically in sovereign developing countries in a national REDD+ era, and ease facilitating FDP tenure. Advances in remote sensing, when combined with carbon ground calibration through FDP partnerships, suggest large potential for accurate economic monitoring of tropical forest emissions under a global REDD+ mechanism.

The average carbon density of mature forest managed by 15 indigenous communities in Guyana appeared locally substantially less (39%) than that of nearby unmanaged forest. The lower carbon density is however modest when considering ecological and socioeconomic attributes, and constitutes a small (less than 7.5%) reduction in overall carbon stocks of titled forest areas when compared to unmanaged forest, which may be negligable for carbon payments under REDD+.

Author Contributions: H.O. conceived, researched and analyzed this article, with contributions from N.B., A.R.C., J.B.L. and J.M.V.F., N.B. prepared biomass data, A.R.C. performed statistical analysis and developed Figure 1. H.O. led writing with significant contributions from N.B., A.R.C., J.B.L. and J.M.V.F. in completing the manuscript.

Acknowledgments: The US National Science Foundation (Grant BE/CNH 05 08094) and the Gordon and Betty Moore Foundation (Grant 2054.01) provided funding for the biomass project, which was designed by the late K.Y. ('Kye') Epps of Stanford University. The larger 'Project Fauna' study was conceived by J.M.V.F. and K.M. Silvius. We thank the Guyana Environmental Protection Agency and the Ministry of Indigenous Peoples for authorizing the field study. The Iwokrama International Centre for Rainforest Conservation and Development, the North Rupununi District Development Board, and the South Central and Deep South Districts Toshaos Council acted as in-country partners and provided important logistic support. Many thanks go to the Makushi and Wapichan technicians and all other Project Fauna personnel, and Takuya Iwamura for remote sensing data on titled forest areas. This article is dedicated to the memory of our colleague Kye Epps (Stanford University).

References

1. United Nations Framework Convention on Climate Change. Safeguards Factsheet. 2016. Available online: http://redd.unfccc.int/fact-sheets/safeguards.html (accessed on 10 October 2016).
2. United Nations Framework Convention on Climate Change. Adoption of the Paris Agreement. COP 21. 2015. Available online: http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf (accessed on 20 September 2017).
3. United Nations Framework Convention on Climate Change. Country Submissions. 2015. Available online: http://redd.unfccc.int/submissions.html?topic=6 (accessed on 20 September 2017).
4. Mbatu, R.S. REDD+ research: Reviewing the literature, limitations and ways forward. *For. Policy Econ.* **2016**, *73*, 140–152. [CrossRef]
5. Rights and Resources Initiative. Indigenous Peoples and Local Community Tenure in the INDCs. Status and Recommendations. 2016. Available online: http://rightsandresources.org/wp-content/uploads/2016/06/

Indigenous-Peoples-and-Local-Community-Tenure-in-the-INDCs_RRI_April-2016_Summary.pdf (accessed on 2 August 2017).
6. Rights and Resources Initiative. Community Rights and Tenure in Country Emission Reduction Programs. Status and Risks for the FCPF Carbon Fund. 2016. Available online: http://rightsandresources.org/wp-content/uploads/2016/06/RRI_Community-Rights-and-Tenure-in-Country-Emission-Reduction-Programs_June-2016.pdf (accessed on 2 August 2017).
7. Newton, P.; Miller, D.C.; Byenkya, M.A.A.; Agrawal, A. Who are forest-dependent people? A taxonomy to aid livelihood and land use decision-making in forested regions. *Land Use Policy* **2016**, *57*, 388–395. [CrossRef]
8. Sills, E.O.; Atmadja, S.S.; de Sassi, C.; Duchelle, A.E.; Kweka, D.L.; Resosudarmo, I.A.P.; Sunderlin, W.D. (Eds.) *REDD+ on the Ground: A Case Book of Subnational Initiatives across the Globe*; CIFOR: Bogor, Indonesia, 2014.
9. Friends of the Earth. The Great REDD Gamble. 2014. Available online: http://www.foei.org/wp-content/uploads/2014/09/The-great-REDD-gamble.pdf (accessed on 28 September 2015).
10. World Rainforest Movement. REDD: A Collection of Conflicts, Contradictions and Lies. 2015. Available online: http://wrm.org.uy/wp-content/uploads/2014/12/REDD-A-Collection-of-Conflict_Contradictions_Lies_expanded.pdf (accessed on 26 August 2015).
11. Global Alliance Against Redd. 2016. Available online: http://no-redd.com (accessed on 20 July 2016).
12. No REDD in Africa Network. 2016. Available online: http://no-redd-africa.org (accessed on 20 July 2016).
13. Sunderlin, W.D.; Larson, A.M.; Duchelle, A.E.; Resusodarmo, I.A.P.; Huynh, T.B.; Awono, A.; Dokken, T. How are REDD+ proponents addressing tenure problems? Evidence from Brazil, Cameroon, Tanzania, Indonesia, and Vietnam. *World Dev.* **2014**, *55*, 37–52. [CrossRef]
14. Larson, A.M.; Brockhaus, M.; Sunderlin, W.D.; Duchelle, A.; Babon, A.; Dokken, T.; Pham, T.; Resosudarmo, I.A.P.; Selaya, G.; Awono, A.; et al. Land tenure and REDD+: The good, the bad and the ugly. *Glob. Environ. Chang.* **2013**, *23*, 678–689. [CrossRef]
15. Loft, L.; Ravikumar, A.; Gebara, M.F.; Pham, T.T.; Resosudarmo, I.A.P.; Assembe, S.; Gonzales Tovar, J.; Mwangi, E.; Andersson, K. Taking stock of carbon rights in REDD+ candidate countries: Concept meets reality. *Forests* **2015**, *6*, 1031–1060. [CrossRef]
16. Duchelle, A.E.; de Sassi, C.; Jagger, P.; Cromberg, M.; Larson, A.M.; Sunderlin, W.D.; Atmadja, S.S.; Resusodarmo, I.A.P.; Pratama, C.D. Balancing carrots and sticks in REDD+: Implications for social safeguards. *Ecol. Soc.* **2017**, *22*, 2. [CrossRef]
17. Fischer, R.; Hargita, Y.; Günter, S. Insights from the ground level? A content analysis review of multi-national REDD+ studies since 2010. *For. Policy Econ.* **2015**, *66*, 47–58. [CrossRef]
18. Government of Guyana. The Reference Level for Guyana's REDD+ Program. 2015. Available online: http://redd.unfccc.int/files/guyanas_proposal_for_reference_level_for_redd__-_final_sept_2015.pdf (accessed on 23 October 2015).
19. United Nations Framework Convention on Climate Change. Report on the Technical Assessment of the Proposed Forest Reference Emission Level of Guyana Submitted in 2014. 2015. Available online: http://unfccc.int/resource/docs/2015/tar/guy.pdf (accessed on 22 November 2016).
20. Office of the President. Draft Opt-In Mechanism Strategy. Draft for Discussion; 2014. Available online: http://www.lcds.gov.gy/index.php/documents/reports/local/draft-opt-in-strategy (accessed on 12 October 2017).
21. Nepstad, D.; Schwartzman, S.; Bamberger, B.; Santilli, M.; Ray, D.; Schlesinger, P.; Lefebvre, P.; Alencar, A.; Prinz, E.; Fiske, G.; et al. Inhibition of Amazon deforestation and fire by parks and indigenous lands. *Conserv. Biol.* **2006**, *20*, 65–73. [CrossRef] [PubMed]
22. Rights and Resources Initiative. Recognizing Indigenous and Community Rights. Priority Steps to Advance Development and Mitigate Climate Change. 2014. Available online: http://www.rightsandresources.org/wp-content/uploads/Securing-Indigenous-and-Communtiy-Lands_Final_Formatted.pdf (accessed on 9 August 2016).
23. Stevens, C.; Winterbottom, R.; Springer, J.; Reytar, K. *Securing Rights, Combatting Climate Change*; World Resources Institute/Rights and Resources Initiative: Washington, DC, USA, 2014.
24. Guyana Bureau of Statistics. Compendium 2 Population Composition. 2016. Available online: http://www.statisticsguyana.gov.gy/census.html#comp (accessed on 23 January 2018).
25. Bulkan, J. 'Original lords of the soil'? The erosion of Amerindian territorial rights in Guyana. *Environ. His.* **2016**, *22*, 351–391. [CrossRef]

26. Guyana Forestry Commision and INDUFOR Asia Pacific. Guyana REDD+ Monitoring Reporting & Verification System (MRVS). Year 5 Summary Report. 1 January 2014–31 December 2014. Version 1; 2015. Available online: http://www.forestry.gov.gy/wp-content/uploads/2015/10/MRVS-Summary-Report-Year-51.pdf (accessed on 27 October 2015).
27. Government of Guyana. Amerindian Act 2006. Act No 6 of 2006; 2006. Available online: http://parliament.gov.gy/documents/acts/4680-act_no_6_of_2006.pdf (accessed on 5 October 2013).
28. Da Fonseca, G.A.B.; Rodrigues, C.M.; Midgley, G.; Busch, J.; Hannah, L. Mittermeier R.A. No forest left behind. *PLoS Biol.* **2007**, *5*, e216. [CrossRef] [PubMed]
29. CIA. The World Factbook. 2015. Available online: https://www.cia.gov/library/publications/the-world-factbook/geos/gy.html (accessed on 6 November 2016).
30. Forest Carbon Partnership Facility. REDD+ Country Participants. 2017. https://www.forestcarbonpartnership.org/redd-countries-1 (accessed on 20 September 2017).
31. Joint Concept Note. Joint Concept Note on REDD Cooperation between Guyana and Norway. Third Update. 2015. Available online: http://www.regjeringen.no/en/aktuelt/norge-vil-gi-300-millioner-til-guyana/id2410147/ (accessed on 26 May 2015).
32. The REDD Desk. REDD in Guyana. 2016. Available online: http://theredddesk.org/countries/guyana (accessed on 23 April 2016).
33. Brown, S.; Goslee, K.; Casarim, F.; Harris, N.L.; Petrova, S. Sampling Design and Implementation Plan for Guyana's REDD+ Forest Carbon Monitoring System (FCMS): Version 2. Submitted by Winrock International to the Guyana Forestry Commission; 2014. Available online: http://www.forestry.gov.gy/Downloads/Guyana_Sampling_Design_and_Implementation_Plan_for_FCMS.pdf (accessed on 26 February 2015).
34. Luzar, J.B.; Silvius, K.M.; Overman, H.; Giery, S.T.; Read, J.M.; Fragoso, J.M.V. Large-scale environmental monitoring by indigenous peoples. *BioScience* **2011**, *61*, 771–781. [CrossRef]
35. Read, J.M.; Fragoso, J.M.V.; Silvius, K.M.; Luzar, J.; Overman, H.; Cummings, A.; Giery, S.T.; Flamarion de Oliveira, L. Space, place, and hunting patterns among indigenous peoples of the Guyanese Rupununi region. *J. Latin Am. Geogr.* **2010**, *9*, 213–243. [CrossRef]
36. Cummings, A.R. For Logs, for Traditional Purposes and for Food: Identification of Multiple-Use Plant Species of Northern Amazonia and an Assessment of Factors Associated with Their Distribution. Ph.D. Dissertation, Syracuse University, Syracuse, NY, USA, 2013.
37. Butt, N.; Epps, K.; Overman, H.; Iwamura, T.; Fragoso, J.M.V. Assessing carbon stocks using indigenous peoples' field measurements in Amazonian Guyana. *For. Ecol. Manag.* **2015**, *338*, 191–199. [CrossRef]
38. Intergovernmental Panel on Climate Change (IPCC). *Good Practice Guidance for Land Use, Land-Use Change and Forestry*; Penman, J., Gytarsky, M., Hiraishi, T., Krug, T., Kruger, D., Pipatti, R., Buendia, L., Miwa, K., Ngara, T., Tanabe, K., et al., Eds.; IPCC/IGES: Hayama, Japan, 2003.
39. R Development Core Team. *R: A Language and Environment for Statistical Computing*; R Development Core Team: Vienna, Austria, 2016; ISBN 3-900051-07-0.
40. Inter-American Institute for Cooperation on Agriculture. Workshop on the Production, Processing and Marketing of Peanuts in the Rupununi, Region 9. Workshop Proceedings and Plan of Action. 2000. Available online: https://books.google.com.br/books?id=_McqAAAAYAAJ&pg=PP1&lpg=PP1&dq=Inter-American+Institute+for+Cooperation+on+Agriculture+2000+Workshop+on+the+production,+processing+and+marketing+of+peanuts+in+the+rupununi,+Region+9.+Workshop+proceedings+and+plan+of+action.+Feb+25-28,+2000.&source=bl&ots=Kkocb5AkFd&sig=ZdoJZ5sRb8O_lMbFHXsIaPCGKi4&hl=en&sa=X&ved=0ahUKEwix0Mist5jKAhVLdj4KHS-MDLgQ6AEIIDAA#v=onepage&q=income&f=false (accessed on 23 March 2017).
41. Xavier, B. Community Participation in the Management of the Cock-of-the-Rock as an Eco-tourism Initiative. Master's Thesis, University of Guyana, Georgetown, Guyana, 2007.
42. Conservation International-Guyana. The Rupununi Economic and Ecological Baseline Report. 2015. Available online: http://conservation.org.gy/publications/Economic_Baseline_report.pdf (accessed on 23 March 2017).
43. Skoufias, E. *A Poverty Map for Guyana*; World Bank: Washington, DC, USA, 2005.
44. Guyana Chronicle. New Minimum Wage Order. 2016. Available online: http://guyanachronicle.com/2016/11/24/new-minimum-wage-order (accessed on 6 July 2016).

45. Chave, J.; Condit, R.; Lao, S.; Caspersen, J.; Foster, R.; Hubbell, S. Spatial and temporal variation of biomass in a tropical forest: Results from a large census plot in Panama. *J. Ecol.* **2003**, *91*, 240–252. [CrossRef]
46. Kerrett, R.; Wit, M. *Chainsaw Milling in Guyana: A Synopsis of the Issues*; Tropenbos International: Wageningen, The Netherlands, 2009.
47. Trevin, J.; Nasi, R. *Forest Law Enforcement and Governance and Forest Practices in Guyana*; CIFOR/IWOKRAMA: Bogor, Indonesia, 2009.
48. Pearson, T.; Brown, S.; Casarim, F. Carbon emissions from tropical forest degradation caused by logging. *Environ. Res. Lett.* **2014**, *9*. [CrossRef]
49. Sabogal, D.; Global Canopy Programme, Oxford, UK. Personal communication, 2015.
50. Ter Steege, H.; Hammond, D.S. Character convergence, diversity and disturbance in a tropical rainforest in Guyana. *Ecology* **2001**, *82*, 3197–3212. [CrossRef]
51. Fragoso, J.M.V.; Levi, T.; Oliveira, L.F.B.; Luzar, J.B.; Overman, H.; Read, J.M.; Silvius, K.M. Line transect surveys under detect terrestrial mammals: Implications for the sustainability of subsistence hunting. *PLoS ONE* **2016**, *11*, e0152659. [CrossRef] [PubMed]
52. Skutsch, M. (Ed.) *Community Forest Monitoring for the Carbon Market*; Opportunities under REDD; Earthscan: London, UK, 2011; 186p.
53. Danielsen, F.; Adrian, T.; Brofeldt, S.; van Noordwijk, M.; Poulsen, M.K.; Rahayu, S.; Rutishauser, E.; Theilade, I.; Widayati, A.; The An, N.; et al. Community monitoring for REDD+: International promises and field realities. *Ecol. Soc.* **2013**, *18*, 41. [CrossRef]
54. Paneque-Gálvez, J.; McCall, M.K.; Napoletano, B.M.; Serge, A.; Wich, S.A.; Pin Koh, L. Small drones for community-based forest monitoring: An assessment of their feasibility and potential in tropical areas. *Forests* **2014**, *5*, 1481–1507. [CrossRef]
55. Bellfield, H.; Sabogal, D.; Goodman, L.; Leggett, M. Case study report: Community-based monitoring systems for REDD in Guyana. *Forests* **2015**, *6*, 133–156. [CrossRef]
56. Venter, M.; Venter, O.; Edwards, W.; Bird, M.I. Validating community-led forest biomass assessments. *PLoS ONE* **2015**, *10*, e0130529. [CrossRef] [PubMed]
57. Cummings, A.R.; McKee, A.; Kulkarni, K.; Markandey, N. The rise of UAVs. *Photogramm. Eng. Remote Sens.* **2017**, *83*, 317–325. [CrossRef]
58. Cummings, A.R.; Cummings, G.R.; Hamer, E.; Moses, P.; Norman, Z.; Captain, V.; Bento, R.; Butler, K. Developing a UAV-based monitoring program with Indigenous Peoples. *J. Unmanned Vehicle Syst.* **2017**. [CrossRef]
59. Asner, G.P.; Mascaro, J. Mapping tropical forest carbon: Calibrating plot estimates to a simple LiDAR metric. *Remote Sens. Environ.* **2014**, *140*, 614–624. [CrossRef]
60. Mitchard, E.T.A.; Feldpausch, T.R.; Brienen, R.J.W.; Lopez-Gonzalez, G.; Monteagudo, A.; Baker, T.R.; Lewis, S.L.; Lloyd, J.; Quesada, C.A.; Gloor, M.; et al. Markedly divergent estimates of Amazon forest carbon density from ground plots and satellites. *Glob. Ecol. Biogeogr.* **2014**. [CrossRef] [PubMed]
61. Goetz, S.J.; Hansen, M.; Houghton, R.A.; Walker, W.; Laporte, N.; Busch, J. Measurement and monitoring needs, capabilities and potential for addressing reduced emissions from deforestation and forest degradation under REDD+. *Environ. Res. Lett.* **2015**, 123001. [CrossRef]
62. Schimel, D.; Pavlick, R.; Fisher, J.B.; Asner, G.P.; Saatchi, S.; Townsend, P.; Miller, C.; Frankenberg, C.; Hibbard, K.; Cox, P. Observing terrestrial ecosystems and the carbon cycle from space. *Glob. Chang. Biol.* **2015**. [CrossRef] [PubMed]
63. Avitabile, V.; Herold, M.; Heuvelink, G.B.M.; Lewis, S.L.; Phillips, O.L.; Asner, G.P.; Armston, J.; Ashton, P.S.; Banin, L.; Bayol, N.; et al. An integrated pan-tropical biomass map using multiple reference datasets. *Glob. Chang. Biol.* **2016**, *22*, 1406–1420. [CrossRef] [PubMed]
64. Reiche, J.; Souza, C.M.; Hoekman, D.H.; Verbesselt, J.; Persaud, H.; Herold, M. Feature level fusion of multi-temporal ALOS PALSAR and Landsat data for mapping and monitoring of tropical deforestation and forest degradation. *IEEE J. Sel. Top. Appl. Earth Obs. Remote Sens.* **2013**, *6*, 2159–2173. [CrossRef]
65. Mitchell, A. Joint GFOI/GOFC-GOLD R&D Expert Workshop on Approaches to Monitoring Forest Degradation for REDD+. University of Wageningen, 2014. Available online: http://www.gfoi.org/wp-content/uploads/2015/03/GFOI-GOFCGOLD_RDExpertWS2_Report.pdf (accessed on 27 September 2017).

66. DigitalGlobe. The DigitalGlobe Constellation 2017. Available online: https://dg-cms-uploads-production.s3.amazonaws.com/uploads/document/file/223/Constellation_Brochure_forWeb.pdf (accessed on 15 August 2017).
67. Planet. Monitor and Manage Global Forestry. 2017. Available online: https://www.planet.com/products/hi-res-monitoring/ (accessed on 15 August 2017).
68. Schulte to Bühne, H.; Pettorelli, N. Better together: Integrating and fusing multispectral and radar satellite imagery to inform biodiversity monitoring, ecological research and conservation science. *Methods Ecol. Evolut.* **2017**. [CrossRef]
69. Pearson, T.R.H.; Brown, S.; Murray, L.; Sidman, G. Greenhouse gas emissions from tropical forest degradation: An underestimated source. *Carbon Balance Manag.* **2017**, *12*. [CrossRef] [PubMed]
70. Rakatama, A.; Pandit, R.; Ma, C.; Iftekhar, S. The costs and benefits of REDD+: A review of the literature. *For. Policy Econ.* **2017**, *75*, 103–111. [CrossRef]
71. Strassburg, B.; Turner, R.K.; Fisher, B.; Schaeffer, R.; Lovett, A. Reducing emissions from deforestation—The "combined incentives" mechanism and empirical simulations. *Glob. Environ. Chang.* **2009**, *19*, 265–278. [CrossRef]
72. Ter Steege, H.; Pitman, N.C.A.; Phillips, O.L.; Chave, J.; Sabatier, D.; Duque, A.; Molino, J.; Prévost, M.; Spichiger, R.; Castellanos, H.; et al. Continental-scale patterns of canopy tree composition and function across Amazonia. *Nature* **2006**, *443*, 444–447. [CrossRef] [PubMed]
73. Carbon Tracker Initiative, Climate Action Tracker Consortium, Potsdam Institute for Climate Impact, Yale University. 2020 the Climate Turning Point. 2017. Available online: http://www.mission2020.global/2020%20The%20Climate%20Turning%20Point.pdf (accessed on 10 July 2017).
74. Carbon Pricing Leadership Coalition. Report of the High-Level Commission on Carbon Prices. Commission Chairs J. Stiglitz and N. Stern. 2017. Available online: https://static1.squarespace.com/static/54ff9c5ce4b0a53decccfb4c/t/59244eed17bffc0ac256cf16/1495551740633/CarbonPricing_Final_May29.pdf (accessed on 6 June 2017).
75. May-Tobin, C. *Points of Reference: Finding Common Ground among Reference Level Approaches to Move REDD+ Forward*; Union of Concerned Scientists: Cambridge, MA, USA, 2011.
76. Overman, H.; Cummings, A.R.; Luzar, J.B.; Fragoso, J.M.V. National REDD+ Outcompetes Gold and Logging: The Potential of Cleaning Profit Chains. *PeerJ* **2018**. [CrossRef]
77. De Sy, V.; Herold, M.; Achard, F.; Beuchle, R.; Clevers, J.G.P.W.; Lindquist, E.; Verchot, L. Land use patterns and related carbon losses following deforestation in South America. *Environ. Res. Lett.* **2015**, *10*, 124004. [CrossRef]
78. Elias, P.; May-Tobin, C. Tropical forest regions. In *What's Driving Tropical Deforestation Today? The Root of the Problem*; Boucher, D., Elias, P., Lininger, K., May-Tobin, C., Roquemore, S., Saxon, E., Eds.; Union of Concerned Scientists: Cambridge, MA, USA, 2011.
79. Houghton, R.A. How well do we know the flux of CO_2 from land-use change? *Tellus* **2010**, *62*, 337–351. [CrossRef]
80. Guyana Geology and Mines Commission. Guyana's Gold and Diamond Mining Subsector. Economic and Legal Framework. Presentation (W. Alleyne) to UN Environmental Program. 2010. Available online: http://unep.org/chemicalsandwaste/Portals/9/Mercury/Documents/ASGM/Presentations_Forum/Day%202/guyana\T1\textquotelefts_gold_and_diamond.pdf (accessed on 25 September 2015).
81. Guyana Forestry Commission. Forest Sector Information Report January–June 2014. 2014. Available online: http://www.forestry.gov.gy/Downloads/Forest_Sector_Information_Report_January_to_June_2014.pdf (accessed on 21 May 2015).
82. Boucher, D.; Elias, P.; Lininger, K.; May-Tobin, C.; Roquemore, S.; Saxon, E. (Eds.) The Root of the Problem. What Is Driving Tropical Deforestation Today? 2011. Available online: http://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/UCS_RootoftheProblem_DriversofDeforestation_FullReport.pdf (accessed on 29 September 2015).
83. Strassburg, B.B.N.; Latawiec, A.E.; Barioni, L.G.; Nobre, C.A.; da Silva, V.P.; Valentim, J.F.; Vianna, M.; Assad, E.D. When enough should be enough: Improving the use of current agricultural lands could meet production demands and spare natural habitats in Brazil. *Glob. Environ. Chang.* **2014**, *28*, 84–97. [CrossRef]

84. Poorter, L.; Bongers, F.; Mitchell Aide, T.; Almeyda Zambrano, A.M.; Balvanera, P.; Becknell, J.M.; Boukili, V.; Brancalion, P.H.S.; Broadbent, E.N.; Chazdon, R.L.; et al. Biomass resilience of Neotropical secondary forests. *Nature* **2016**. [CrossRef] [PubMed]
85. Baccini, A.; Walker, W.; Carvalho, L.; Farina, M.; Sulla-Menashe, D.; Houghton, R.A. Tropical forests are a net carbon source based on aboveground measurements of gain and loss. *Science* **2017**. [CrossRef] [PubMed]
86. Colchester, M.; LaRose, J.; James, K. *Mining and Amerindians in Guyana*; The North-South Institute: Ottawa, ON, Canada, 2002.
87. Lambin, E.F.; Turner, B.L.; Geist, H.J.; Agbola, S.B.; Angelsen, A.; Bruce, J.W.; Coomes, O.T.; Dirzo, R.; Fischer, G.; Folke, C.; et al. The causes of land-use and land-cover change: Moving beyond the myths. *Glob. Environ. Chang.* **2001**, *11*, 261–269. [CrossRef]

Assessing the Progress of REDD+ Projects towards the Sustainable Development Goals

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Received: 20 August 2018; Accepted: 19 September 2018; Published: 21 September 2018

Abstract: Almost a decade since the establishment of Reducing Emissions from Deforestation and Degradation (REDD+), this study investigates the extent to which REDD+ projects are delivering on the promise of co-benefits and the elusive 'triple-win' for climate, biodiversity, and local communities. The Climate, Community and Biodiversity Alliance (CCB) is among several leading REDD+ certification standards that are designed to support the delivery of social and environmental co-benefits, and 'socially-just' carbon. This study uses an in-depth content analysis of 25 subnational REDD+ project documents to assess the extent to which REDD+ project objectives align with Sustainable Development Goals (SDG) targets, and evaluates the reporting of progress towards meeting these objectives. Currently the CCB standards address a relatively small subset of SDG targets. Despite this, we find that REDD+ projects aspire to work on a much broader set of SDG target objectives, thus going beyond what the CCB Standards require for REDD+ validation. However, although reviewed REDD+ projects have these aspirations, very few are actively monitoring impact against the goals. There is a gap between aspiration and reported progress at the goal level, and for each project: on average, only a third of SDGs that are being targeted by REDD+ projects are showing 'improvement'. The analysis shows which global goals are most frequently targeted, and which are the least. It also allows an analysis of which projects are following through most effectively in terms of monitoring progress towards the SDGs. This assessment provides insights into the priorities of REDD+ project proponents, suggesting that REDD+ has unfulfilled potential to elicit positive change in relation to the SDGs. Our analysis also shows that there is considerable potential for the safeguarding bodies to do more to ensure that real improvements are made, and reported against, aligning REDD+ projects more strongly with global development agendas.

Keywords: REDD+; CCB Standards; Sustainable Development Goals; climate change; community; biodiversity; development; forests

1. Introduction

Amidst rapid social, political and environmental change, questions over the use, value, and control of forests are vital to the protection and conservation of these ecosystems. Reducing Emissions from Deforestation and Degradation (REDD+), was established under the United Nations Framework Convention on Climate Change (UNFCCC) nearly a decade ago and is a highly visible intervention in global forest conservation. REDD+ is primarily a Payments for Ecosystem Services (PES) system, which economically rewards resource managers for the secure provision of ecosystem services [1]. In the case of REDD+, the PES system remunerates forest managers in the Global South for reducing

deforestation and degradation, thus reducing carbon emissions. Carbon offset credits are 'sold' to (often Global North) buyers [2]. Under the UNFCCC, REDD+ refers to the full range of policy approaches and positive incentives undertaken by nations to support activities that reduce emissions from deforestation and forest degradation, and the enhancement of forest carbon stocks through conservation and sustainable management of forests. The potential for conservation co-benefits from these forestry activities have provided an important potential new source of international finance for biodiversity conservation efforts [3]. As evidence continues to support the critical importance of forests to local livelihoods [4] efforts have been made to ensure that livelihood benefits are realized as part of REDD+, to avoid adverse unintended consequences on forest-dependent and forest-adjacent populations in developing countries. The use of market principles to protect tropical forests in order to mitigate climate change has also raised important concerns about justice for local, indigenous communities [5,6]. In response, the international development community has developed frameworks to reduce the risk of negative social and environmental outcomes from REDD+ projects. The 'Cancun Safeguards', agreed by UNFCCC parties at the sixteenth session of the Conference of the Parties (COP16) in 2010, require that 'free, prior, and informed consent' is obtained to protect the rights of indigenous people living in project zones, as well as mandating regular reporting on the progress of safeguards [7]. These mandatory safeguards still provide flexibility in REDD+ design, allowing project proponents to respond to local contexts and circumstances. REDD+ has gained widespread acceptance as a mechanism for developing countries to reduce forest degradation and associated CO_2 emissions [8,9], whilst offering unprecedented opportunities to provide community and biodiversity 'co-benefits' in project zones—a 'triple-win' scenario.

A number of reporting frameworks have emerged to guide best practice in the REDD+ context. Complementary to the Cancun Safeguards, these include the Climate, Community and Biodiversity Alliance (CCB) standards, which provide third party certification of REDD+ activities, allowing for greater confidence in the veracity of claims made by project proponents, especially for investors and buyers in the emerging market for REDD+ carbon credits [10]. It is hoped that such accreditations will enhance the monetary and moral value of projects in the global marketplace through the certified assurance of socially- and environmentally-just carbon—the sought after 'triple-win' for climate, community, and biodiversity [11]. These standards can help governments and project developers implement activities which contribute (net) positive co-benefits for local biodiversity and communities, whilst mitigating the potential negative outcomes of REDD+ on these entities [12]. The CCB standards were established in 2005, featured prominently in the COP16 agreements, and are now amongst the most widely used of certification standards, with more than 130 projects worldwide having sought accreditation. To date, CCB has issued 39,201,081 verified carbon units (1 verified carbon unit (VCU) = 1 tonne of carbon) to a range of forestry programs worldwide [13]. CCB certification is applied for voluntarily by project proponents and it represents a desirable seal of approval for many communities, corporate investors, and governments.

The CCB Standards require projects to be evaluated by independent auditors at the validation (design) stage and verified periodically over the project lifetime. The reporting requirements of the Standards are designed to promote a high level of transparency and accountability, but do not specifically state how certain criteria should be addressed, fulfilled, monitored, measured, and reported. Proponents must identify the best way to communicate this information to auditors in project validation and verification reports—some guidance and template documents are made available by CCB to project proponents, but they are not always used. At present, most standards suffer from a lack of specificity, and do not provide a comprehensive framework for assessing the quality of governance and overall effectiveness of REDD+ projects [14]; the CCB standards have these same challenges. Inevitably, any attempt to synthesize REDD+ outcomes based on documentation from these audit processes will reflect the limitations of the verification and monitoring processes themselves, and the extent to which these processes recognize the complex political economy context within which REDD+ projects are implemented [14,15]. Recent work on the quality of REDD+ governance at the intergovernmental

level, with implementation agency- and country-levels has resulted in proposals for governance standards that could provide greater assurance about the overall legitimacy and accountability of the mechanism [14]. As the current CCB standards do not explicitly address quality of governance, our analysis does not assess these specific concerns about how these governance issues might impact REDD+ effectiveness. Our analysis is limited to project-level plans and outcomes, as reported in design and verification documents under the CCB standards. Although project level outcomes are clearly impacted by macro scale political economy issues, project proponents and implementers have less direct influence on how REDD+ is governed at country and intergovernmental levels. Our current exercise is analytically specific to the project level outcomes based on these existing standards, and it remains valid, despite concerns about the overall governance and legitimacy of REDD+ implementation at a more macro scale.

Alongside the expansion of REDD+ activities in recent years, a new global development agenda has been established under the framework of the Sustainable Development Goals (SDGs). Adopted by the United Nations (UN) General Assembly in September 2015, this set of 17 Goals and 169 related targets unite a wide array of social and environmental issues, including education, health, and biodiversity, with an aspiration to achieve these globally by 2030 [16]. The Goals are increasingly being used to guide government policy worldwide, and they are also increasingly being adopted by businesses and other organizations that are keen to engage with the current global development agenda. The high level of acceptance, and the authority across diverse sectors, that the SDGs have attained make them a useful evaluative framework for the present analysis, commanding greater recognition and validity than other alternatives. We recognize that the SDGs framework, while being widely accepted, has also been subjected to considerable critique since its inception, with commentators suggesting that this remains a vague and fragmented concept, with little practical value [17,18]. Others raise concerns of governance: Like the CCB Standards, the SDGs are not legally binding, and governments must voluntarily support the Goals, and they are responsible for mobilizing policy and practice in accordance with the Goals, and for monitoring progress. Where accountability systems are weak, transparency is lacking and private interests are strong, there is risk of the Goals being implemented in ways which conflict with local needs [19]. Despite these critiques, the SDGs do provide an increasingly accepted set of targets for assessing progress, and provide a useful framework for the evaluation of a diverse set of REDD+ projects.

Both REDD+ and the SDGs represent aspirational ambitions for the global community, but much of their potential depends on the ways in which these goals are translated into meaningful (and verifiable) local actions. The SDGs encapsulate contemporary social and environmental concerns, and they increasingly guide the development policies of Governments and corporates worldwide [9]. They have a broad reach, are well-publicized, and are increasingly better understood. The FAO's recent report, The State of the World's Forests [9], recognizes the contributions of forests to all of the SDGs, and it supports the need for responsible, coherent policy-making mobilized around forest management and the SDGs [20]. REDD+ has been recognized as an instrument to help achieve the 2030 Agenda [21], and some projects have started to acknowledge the SDGs in their activities [22]. This analysis draws on these two global-scale developments—REDD+ and the SDGs—assessing the ways in which REDD+ aspires to produce community and biodiversity co-benefits with relation to the SDGs, and importantly the extent to which current projects are delivering on these aspirations. Exploring the extent to which REDD+ projects align with SDG goals and targets in their intentions and outcomes enables us to identify the potential of REDD+, in order to practically and responsibly contribute to broader development agendas.

This paper provides an empirically-informed exploration of the synergies between the SDGs and REDD+ projects, and suggests a method for project proponents to operationalize and document REDD+ outcomes which resonate with global development agendas. Whilst flexibility in REDD+ may allow location-specific and locally relevant project design, the subsequent diversity of content—including project objectives, activities, reporting metrics and outcomes—renders the task of comparison between

and assessment of REDD+ projects difficult [23]. This paper proposes an innovative approach to address this gap, using the UN Sustainable Development Goals (SDGs) as an evaluative framework. It compares and assesses the success of verified REDD+ projects using the documents that were made available by the CCB, by developing an analytical framework that can handle the diversity of report content. Specifically, we ask (1) in what ways the CCB Standards encourage REDD+ project proponents to orient their activities in accord with the SDG targets; (2) how strongly REDD+ project aims and objectives align with SDGs at the target-level; (3) how successfully REDD+ project activities address their SDG-related objectives, based on the evidence provided upon project verification, and; (4) how REDD+ project proponents might better accommodate and crucially meet global development objectives in their project design and reporting. This exploration comes as a timely contribution, a decade on from REDD+ establishment and amidst ongoing concerns for environmental and social justice surrounding REDD+ [6,11,24].

Our analysis shows that REDD+ projects are evidencing strong alignment with the SDG targets in their proposed activities—and go beyond the requirements of the CCB Standards in doing so. We find a notable gap, however, between the SDG-related aims of projects and their reported (and measured) progress in these fields. We conclude that whilst REDD+ aspirations are demonstrably high, this gap suggests that safeguarding bodies could do more to encourage successful operationalization of REDD+, to deliver and report on the diversity of co-benefits that are potentially achievable. By broadening required performance criteria, CCB and other safeguard frameworks could help REDD+ meet its full potential in relation to broader global development agendas.

2. Materials and Methods

2.1. Information Sources

An analysis of CCB-verified project documents was conducted for this paper, with documents downloaded from the Verified Carbon Standards project database (Appendix A Table A1). The 25 reviewed are REDD+ projects implemented at the subnational scale, within the non-compliance (voluntary) market with independent verification and certification. These documents are prepared by project proponents and provided to auditors at each stage of CCB accreditation, including the validation (design) stage and periodically over the project lifetime, with the first verification being undertaken within five years. Auditors conduct site visits to project zones and use the documents provided to them to assess how a project is performing against CCB standards. Proponents must demonstrate how the 'with-project' scenario shows an improvement on the Project Area/Zone conditions in the absence of the project. Evidencing this requires several stages of reporting: the starting conditions of the project or study, and stakeholder identification; 'without project' and 'with project projections; potential negative impacts, risks, and mitigation/prevention; and appropriate methodologies to document the changes due to the project activities [12,25]. Three editions of CCB standards have now been released, containing 15, 14, and 17 mandatory criteria in standards 1, 2, and 3 respectively [26–28]. Further, 'gold standard' certification can be achieved by meeting at least one of three further components relating to climate change adaptation, 'exceptional' community benefits and 'exceptional' biodiversity benefits.

The Verified Carbon Standard database [13] makes CCB-verified REDD+ project documents publicly available, of which the following two types were drawn upon in this study:

i. Project design documents: Provide details about how project operations and activities demonstrate compliance with CCB criteria. These are updated according to discrepancies highlighted by independent auditors upon validation. An additional validation report indicates project conformance with CCB criteria, highlighting any discrepancies that should be resolved in the project design document before a final validation report is published.
ii. Project implementation reports: Provide detail about how project activities are seeking to deliver net climate, community, and biodiversity benefits, reporting monitoring and project progress against their original objectives. These reports are produced within five years of

initial validation, accompanied by verification reports. Verification reports acknowledge continued conformance with CCB criteria, and they highlight any discrepancies to be resolved by the project.

A total of 25 projects are reviewed, all of which have been verified according to the CCB Standards Second (N = 17) or Third Edition (N = 8), demonstrable by available reports as of 2 July 2018 on the Verified Carbon Standard (VCS) database (Table 1). The online, freely-accessible database is still in operation and up-to-date despite VCS and CCB Standards now both being under the management of the organization and carbon quality assurance provider, Verra. REDD+ projects with either the project design document or project implementation report not available and/or not available in English are excluded.

Table 1. Sampling strategy for reviewed Reducing Emissions from Deforestation and Degradation (REDD+) projects.

Total Verified Carbon Standard Projects	1441
Total Climate, Community and Biodiversity Alliance (CCB) Projects (All Types)	94
Total CCB REDD+ Projects	75
Total CCB–REDD+ Projects (Verified)	30
Total CCB REDD+ Projects (Verified, English Project Design Document and English Project Implementation Report)	25
Total REDD+ Projects Reviewed	25

The SDGs are used here as an evaluative framework to enable comparison between projects with a diverse array of objectives and outcomes, despite these projects having been designed prior to the establishment of the Global Goals. Through in-depth content analysis of these documents, we explore the reported impact of the 25 CCB-verified REDD+ projects, as explained in the following sections.

2.2. Matching SDG and CCB Objectives

The CCB Standards were analyzed to reveal the (minimum) SDG targets that CCB-validated REDD+ projects could be expected to address based on what the Standards require. The analysis finds SDG-correlates in the CCB Standards, which REDD+ projects need to demonstrate compliance with in their validation paperwork. Thus, these SDG-correlates should be the minimum SDGs that CCB-verified projects support. The Standards were analyzed using content/textual analysis, supplemented by keyword searches corresponding to each SDG target (following a similar approach to that reported in [29]. For example, the analysis noted direct linkages to SDGs from keywords such as 'worker safety', 'waste', or 'climate change'. Implicit linkages were fewer and they were also noted where the CCB Standards could be seen as strongly supporting an SDG target. Appendix A Table A2 provides more detail of where and how linkages between the SDGs and the CCB Standards have been recognized using this explicit/implicit methodology.

2.3. Evaluation of the Objectives

The project design documents of the 25 REDD+ projects were also reviewed using content/textual analysis, supplemented by keyword searches corresponding to each SDG target [29]. This focused on their stated objectives and proposed activities, revealing their alignment with SDG targets. Direct and implicit linkages to SDGs from keywords were again noted. For example, SDG target 12.8, which ensures 'people have the relevant information for sustainable development and lifestyles in harmony with nature' [16] (p. 9) was linked to proposed REDD+ plans to train community members to engage in sustainable non-timber forest production. Content analysis of both the CCB Standards and the REDD+ project design documents allowed us to identify three types of SDG targets: (i) those which are expectedly supported in CCB-verified projects, as these correspond to mandatory requirements of the CCB Standards; (ii) those which are highly targeted despite not being a mandatory requirement of CCB accreditation (i.e., REDD+ project proponents are going beyond what is required of them in

support of the global development agenda); (iii) those SDG targets which are not highly targeted, and which we would not necessarily expect REDD+ projects to contribute to.

2.4. Evaluation of Outcomes

We reviewed the latest project implementation reports available for each project, to assess whether SDG-related objectives were being followed through in the implementation of project activities. Content/textual analysis was again used to record project progress at the SDG Goal level. Each REDD+ project's project implementation reports were read in detail, noting where project activities towards the 17 SDGs had been reported. This qualitative information was converted into quantitative form using the numerical score system described below, to allow a degree of comparability between projects.

We tracked the progress towards long-term goals using a four-part scoring framework, which acknowledges that all projects are at different stages along a general pathway of change that would be expected on the way to achieving an ultimate desired output. Articulating each step within a longer-term process of change allows projects' progress to be assessed. A score of 0–3 is given to each project for each of the 17 Global Goals, where 0 = not targeted; 1 = insufficient information; 2 = monitoring variable(s) have been explicitly identified, and/or monitoring is occurring (results may be too soon to see); 3 = outcome monitored and improvement reported (Figure 1). This score system reflects other studies' hypotheses that early outcomes are often strong predictors of projects' long-term impacts [30]. It is these outcomes that are more likely to be picked up upon project verification and included in project implementation reports. Similar impact assessment frameworks have been utilized successfully elsewhere [31,32]. The method was considered an appropriate approach here, as it allows REDD+ projects' progress to be systematically and quantitatively assessed in relation to the SDG targets initially identified in the project design documents.

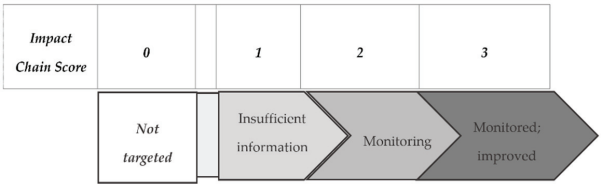

Figure 1. Impact Stages Chain. The 25 project implementation reports were given a score of 0–3 against each of the Sustainable Development Goals to reflect their contribution to the Goals. 0 = not targeted; 1 = insufficient information is given in the project implementation report; 2 = variable is being monitored or has been identified (no improvement yet); 3 = variable is being monitored and improvement is clearly demonstrable.

Our evaluation builds on third-party verification by independent CCB auditors, which we do not seek to dispute or assess independently—our analysis uses these evaluations to explore the relevance and efficacy of REDD+ in relation to the global development agendas. This study does not seek to find the 'best' REDD+ project, and we stress that stronger SDG-alignment does not necessarily make a better project. The impact assessment also allows a qualitative evaluation of approaches, which prove to be consistently effective in the delivery of project outcomes across spatial and temporal scales.

The CCB advises that the REDD+ project proponents distinguish between project activities, project outputs, project outcomes, and project impacts, to demonstrate how they plan to progress from initial project strategies, through activities, to positive impacts in term of climate, communities, and biodiversity [12]. These causal models—known as 'theory of change' models—are useful for explaining how specific interventions can give rise to specific outcomes and impacts, and to resolve the challenge of project 'attribution' required by CCB for project proponents [23]. Our analysis does not use this terminology, as the model has not been universally adopted by proponents in project

implementation reports. It is difficult to make judgments on the stage of impact reached where proponents have not used this criterion in their reporting.

2.5. Limitations

CCB validation and verification is a time-consuming and financially costly venture for proponents and auditors alike. Thus, project proponents do not provide complete detail on all project operations in validation and verification documents, but they often report the minimum that is required to demonstrate conformance with the CCB standards. Whilst the Standards are designed to promote transparency, not all activities will be visible in the project documents assessed here. This is an obvious constraint to the use of the CCB documents as a proxy for project performance, as it is very likely that SDG-relevant activities are under-reported by project proponents. However, short of independent audits of each project using an SDG framework, this remains a useful analytical approach to assess the comparative performance of a large number of relatively mature REDD+ projects in relation to the SDGs.

3. Results

3.1. Matching CCB-SDGs/Evaluation of Objectives

Currently CCB, standards only address a small subset of SDG targets (Figure 2; see also Table A2). Figure 2 points to the minimum number of targets that we would expect CCB-verified REDD+ projects to support. Ten SDG targets would be supported by a REDD+ project seeking no (optional) Gold Level criteria, or only Gold-Level biodiversity criteria, validated against the CCB Standards, Second Edition. In contrast, a project validated according to the CCB Standards Third Edition for all Gold Level criteria would support at least 20 SDG targets. Further descriptive data on the CCB-SDG correlates can be found in Appendix A (Table A2).

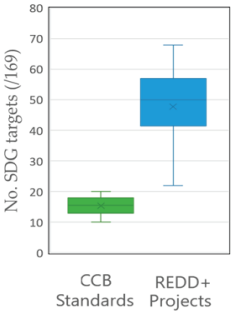

Figure 2. The number of Sustainable Development Goals targets correlating to the Climate, Community and Biodiversity Alliance (CCB) Standards (Second and Third Editions and Gold Standards) and the number of SDG targets supported by Reducing Emissions from Deforestation and Degradation (REDD+) projects in their project design documents. Maximum and minimum values, interquartile range, median line, and cross indicating the mean value of SDG targets that are supported by the Standards and REDD+ projects.

Analyses of the 25 CCB-verified REDD+ projects show which SDG targets were being considered and supported in project designs. Despite the relatively limited requirements within the explicitly stated CCB standards, reviewed REDD+ projects aspire to work on a much broader set of SDG targets (Figure 2). Figure 2 shows how the number of SDG targets addressed varies between the CCB Standards and REDD+ projects. The Second and Third Edition Standards make compulsory criteria relating to only 10 and 14 SDG Targets respectively, across 8 and 10 Goals (respectively). REDD+ projects are on average supporting 48 Targets across 14 Goals in their project design documents. But this value is

not consistent: Project 20 (ID) aspires to support 68 targets across 15 Goals; Project 22 supports just 22 targets across 10 Goals—just above the 16 Targets that CCB requires for its specific Gold Level status.

Figure 3 describes which CCB Standards criterion have been deemed to be explicitly linked to SDG targets. Figure 3 shows that many targets for Goal 15 for biodiversity are encapsulated in the Standards' overall demand that projects have no negative impact on biodiversity within project zones. Targets of Global Goal 16 (Justice) and Goal 8 (Decent Work, and specifically 8.8 for worker rights) are largely covered in the Standards criteria for best practice procedures—which are designed to complement the UNFCCC REDD+ safeguards (a–d).

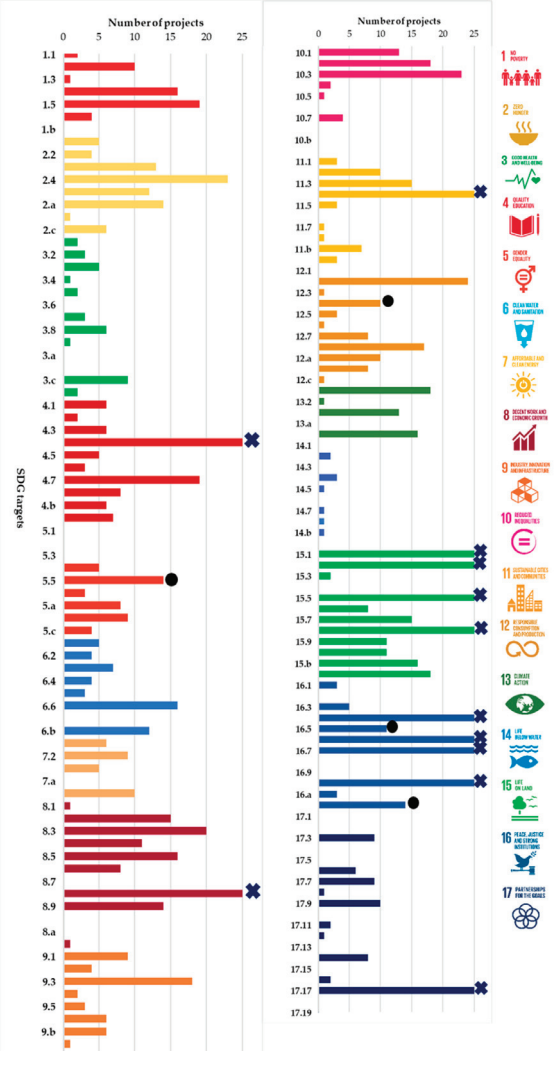

Figure 3. Numbers of REDD+ projects (out of 25) that have sustainability objectives similar to those listed as SDG targets. X = targets corresponding to requirements of both CCB Standards (N = 25); O = targets corresponding to the requirements of the Third Edition only. Gold Level Criteria not highlighted here; see Supplementary Material. All 169 targets of Goals 1-17 are shown, with or without labels.

Figure 3 also summarizes how many projects have presented plans in line with each SDG target, showing (as expected) that SDG targets which are strongly linked to mandatory CCB Standards criteria (X and O on Figure 3) were targeted by all projects (of that particular CCB Standards Edition). Overall, the projects reviewed here demonstrated strong alignment with the SDGs in their stated objectives. All but three Goals were supported by more than 12 (of the 25 reviewed) projects. Global Goals 3 (Health and Well-being), 7 (Clean Energy), and 14 (Life below Water) are targeted by only nine, nine, and three projects respectively. Figure 3 points to where: (1) SDG targets which link to optional CCB criteria on climate, community, and biodiversity, are being frequently targeted in REDD+ project design documents, and (2) (perhaps more importantly) where SDG targets are being highly targeted in REDD+ project design documents, to further the requirements of the CCB.

Certain SDG targets are linked to Gold Standard CCB criteria (Figure 3) and so they are only targeted where deemed applicable by project proponents. Targets 13.1 and 13.b, seeking to strengthen adaptive capacity to climate change, fall into this category—the gold-level criteria require proponents to identify the likely regional climate change scenarios and impacts on communities/biodiversity, and to demonstrate the measures that are been taken to assist communities in adapting to these. Many REDD+ project zone communities expect to see extreme climate changes over the project lifetime (increased rainfall, drought severity, temperature rises). Such changes could adversely affect community wellbeing, which is disallowed by the Standards, and additionally could undermine overall project success, as causing communities to suffer. Goals 10.2 and 10.3, for equality and inclusiveness in project participation and outcomes, are also highly targeted, and they are a requirement of the optional gold criteria for 'exceptional' community benefits. Thus, not all projects are required to plan activities to benefit the entire range of project zone households, but those that aspire to community gold standard will need to demonstrate their commitment to addressing inequality and inclusiveness.

Perhaps more notable are instances where projects aim to improve areas aligned with SDG targets which are not CCB criteria (mandatory or optional). Global Goals 2 (Hunger), 4 (Education), 8 (Decent Work) and 12 (Responsible Consumption and Production) are examples of this (Figure 3). Many REDD+ project proponents recognize unsustainable farming practices (e.g., slash and burn) as a major threat to deforestation and seek to address these through encouraging more sustainable alternatives, thus preserving the forest. Global Goal 4 for quality education may be supported in recognition of the large role that education plays in sustainable community use and management of the forest environment, and in helping communities cope with changing resources in the context of climate change. Moreover, many REDD+ project proponents will recognize the value of Global Goal 8—job, income, and business creation—for project success. Providing secure employment opportunities in alternative (sustainable) livelihood activities can garner greater support from local stakeholders for project activities. Goal 12, for sustainable production and consumption, brings these three together: in educating and employing local people in sustainable NFTP production/consumption, it is hoped they will be deterred from illegal and damaging (subsistence and/or income-generating) activities (e.g., poaching, logging). Such support activities, among others, could contribute to projects' successful longevity and provide benefits to communities and the environment which extend beyond project lifetimes.

As Figure 3 also identified, several goals (especially Goals 3, 7, and 14) are targeted by only a few projects. Whether REDD+ project proponents should see themselves as responsible for the entire spectrum of SDGs, e.g., reducing deaths and injuries from road traffic accidents (Target 3.6), is debatable, and this is discussed further in Section 4. It is also apparent that certain SDGs, such as Goal 14 for 'Life Below Water', will only be applicable in certain locations (as most REDD+ projects are focused on terrestrial activities). For example, 'life below water', will only be applicable in certain locations (as most REDD+ projects are focused on terrestrial activities).

3.2. Evaluation of Outcomes

Analysis of project verification documents, which report on project progress and demonstrate continued compliance with CCB criteria, tries to differentiate between projects that are and are not monitoring their SDG-related activities, and those that are monitoring, and that can report strong positive outcomes from the project implementation period. Although relatively coarse, this analysis allows for a comparison between hugely diverse REDD+ projects. Table 2 summarizes the progress made by all verified REDD+ projects against each Global Goal, based on the evidence provided in their respective implementation reports. It shows that although reviewed REDD+ projects have far-reaching aspirations in support of the SDGs, very few are actively and systematically monitoring improvement against the goals. The Table exemplifies the diversity of projects, in their activities, monitoring metrics, and importantly that they are all at different stages of their implementation pathways.

Table 2. The number of projects (out of 25) that have reached the impact stages (0–3) recorded by SDG. 0 = not targeted; 1 = insufficient info; 2 = monitoring variable identified/variables are being monitored; 3 = evidence of monitoring and improvement.

Sustainable Development Goal	Impact Stage				Example Monitoring Metrics
	0	1	2	3	
	0	6	13	6	No. of people with improved livelihoods or income resulting from the project
	2	4	12	7	No. of people adopting improved agricultural practices.
	10	4	5	6	Mortality rates; incidence of diarrhea, typhoid.
	0	5	6	14	No. of children attending school; literacy rates of family members.
	6	5	5	9	% women on community councils; no. women employed.
	4	9	4	8	No. of hectares of water source protected; % latrine access.
	8	8	7	2	No. of households/individuals accessing renewable energy.
	1	4	11	9	No. of villagers trained and contracted by the project.
	5	8	8	4	No. of individuals with new knowledge/ skills in business administration/value-added processing.
	4	13	7	1	Income/asset inequality; most disadvantaged communities.
	1	8	8	8	Mapping of cultural identity areas; no. of households with upgraded roof materials.
	0	6	7	12	No. of rubbish collection days/year; no. of ecotourism sites established.
	7	12	3	3	No. of beneficiaries of conservation agriculture.
	21	1	2	1	No. of fishing restriction zones established.

Table 2. *Cont.*

Sustainable Development Goal	Impact Stage				Example Monitoring Metrics
	0	1	2	3	
15 LIFE ON LAND	0	0	13	12	% change in ha better managed by the project for biodiversity; presence of endangered species
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	0	5	9	11	No. of grievances; no. of illegal activities recorded
17 PARTNERSHIPS FOR THE GOALS	1	13	6	5	No. of public-private partnerships agreed.

Figure 4 visualizes the marked gap between the number of SDGs identified at the design stage, relative to the various stages of implementation that REDD+ projects have reached. While most REDD+ projects presented plans in line with 14 out of 17 of the SDGs, most only evidence improvement against five of the Goals. The Figure shows the performance of each project with respect to its stated objectives based on evidence provided at project verification. There was a marked gap seen between each projects' SDG-related aspirations, their identification of monitoring variables, and evidencing 'improvement' in these fields. On average, projects were evidencing improvement against 34% of their initial objectives—meaning that two-thirds of their initial SDG-related activities were either being monitored, but not yet demonstrating improvement, or that monitoring variables had not been identified at all (approximately one third each). Some projects demonstrated improvement across a large proportion of their originally identified SDG-variables (Figure A1). Projects 11 and 12 reported improvements towards 64% and 70% of the Goals that they initially identified, respectively. Figure A1 makes apparent that these projects are targeting slightly fewer goals (14 and 10 out of 17 respectively), but they appear to be doing so more efficaciously, and with a specific concern for systematic and verifiable indicators that allow progress to be monitored.

Figure 5 breaks this information down by SDG, showing there is a gap between aspiration and reported progress at the goal level. This indicates which goals had been more successfully addressed by REDD+ project activities, based on where an evidence of improvement (impact score 3) has been provided in project implementation reports. The most notable gap between aspiration and improvement is visible in Global Goals 7 (Clean Energy), 10 (Equality) and 13 (Climate Change), with improvement reported by only 15.3%, 4%, and 15% projects respectively. Activities relating to these Goals were often described in the project design documents, but few projects articulated any monitoring metrics that were aligned with these activities; even fewer could indicate an improvement. Global Goals 4 (Education) and 12 (Sustainable Production and Consumption) were highly targeted, and they had the highest percentage improvement amongst projects (56% and 48% respectively; Figure 5). These Goals were often supported by projects through the provision of technical and vocational training for community members, oriented towards alternative livelihood activities—acai processing, beekeeping, and ecotourism were often mentioned. Proponents might choose to monitor (including but not limited to) the number of training sessions taking place; the number of community members with improved knowledge (through surveys); and the non-timber forest products (NTFPs) production units established. Half of the projects that supported gender in their activities (Global Goal 5) were also able to report an improvement: higher female participation in project activities was often reported; some reported providing sexual health clinics; others ensured improved (local) female inclusion on higher-level councils in project zones. Goal 15 (Life on Land) was unsurprisingly high, as a mandatory requirement of the CCB Standards is to have a 'net positive' effect on project zone biodiversity. What is not stated is how to monitor this—but demonstrably the majority of proponents are choosing appropriate monitoring indicators to clearly signal their continued compliance with the CCB criteria.

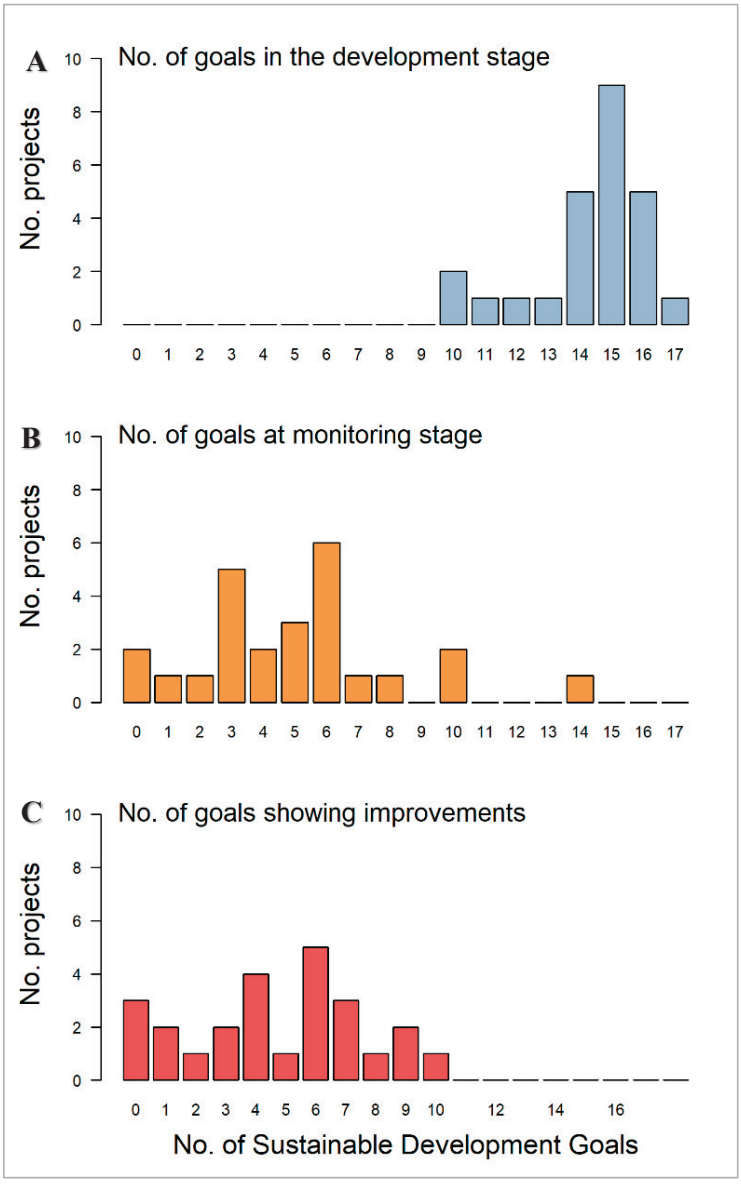

Figure 4. The number of Sustainable Development Goals that are being (**A**) aspired to in project design documents, (**B**) are being monitored or have monitoring variables identified in project implementation reports (no improvement yet), and (**C**) monitored and improvement is clearly demonstrable in project implementation reports, by the 25 reviewed REDD+ projects.

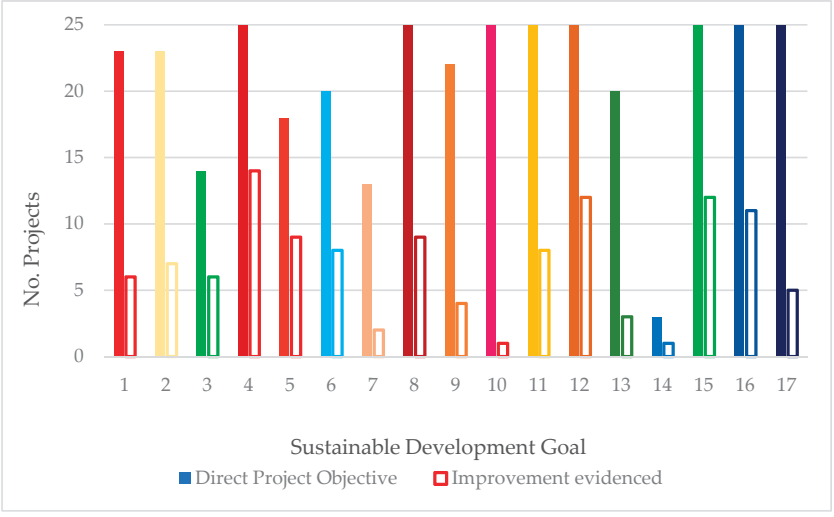

Figure 5. Numbers of REDD+ projects that target specific SDGs in their project design documents (solid boxes), compared to the number of projects reporting improvement (=impact score 3; unfilled boxes) based on project implementation reports. Colors mimic those that are used for SDG icons [16].

4. Discussion

Three years since the 2030 Agenda for Sustainable Development was established, and with REDD+ now a decade old, this exploration comes as a timely investigation into the progress of subnational REDD+ projects on-the-ground and the potential of REDD+ to support the global development agenda. Orienting REDD+ project activities to the SDGs has obvious benefits, with the potential to improve projects' overarching success in reducing emissions from deforestation and degradation through the provision of sustainable co-benefits. To tackle the diversity of REDD+ report content, this study has utilized the 17 Sustainable Development Goals and 169 Targets as an evaluative framework. Independently verified REDD+ projects in different stages of their implementation pathway have been reviewed, revealing the potential synergies between REDD+ and a key component of the contemporary global development agenda.

4.1. Matching CCB and SDG Objectives

As a leading safeguard framework, the CCB Standards (in association with REDD+) seek to avoid both the potential negative impacts of project activities on biodiversity and communities and generate net positive benefits for these entities (Panfil and Harvey, 2014). Since the CCB Standards were created before the SDGs were agreed in 2015, care is needed in explicitly linking the two. However, links are important where they can be found: the CCB Standards make demands of REDD+ project proponents that seek validation, which the SDGs do not—the SDGs being recommendations as opposed to mandatory compliance targets for signatories. Standards could therefore be valuable in suggesting forest management approaches that might better enable countries to deliver challenging SDG outcomes (focused, of course, on the forest sector and allied project activities). Our analysis shows that currently the CCB standards, which are designed to mitigate projects' negative effects, only address a small subset of SDG targets. These targets primarily link to biodiversity and 'best practice' procedures.

4.2. Evaluation of Objectives

The reviewed REDD+ projects are aspiring to work on a much broader set of SDG targets than what the CCB Standards require (Figure 2). The projects demonstrate a strong alignment with the SDGs

in their stated objectives, with all but three SDGs (Goals 3, 7, and 14) addressed by activities proposed by over half of projects (Figure 3). These proposals, described in the project design documents, go beyond the minimum requirements of the CCB Standards—of which there are currently relatively few—and they demonstrate considerable ambition amongst REDD+ project proponents in relation to the wider benefits of the activities that they are intending to undertake in and around their field locations. Importantly, while being demanding, the CCB standards give the project proponents considerable flexibility in the details of project planning, allowing activities to be designed in ways that are locally appropriate. This analysis has shown that project proponents are inclined to contribute multiple and far-reaching co-benefits from their activities, and this indicates the potential use of REDD+ as a vehicle for positive local scale mobilization towards the SDGs.

4.3. Evaluation of Outcomes

Although reviewed REDD+ projects have such high aspirations in relation to the SDGs, very few are actively monitoring progress and impact against the goals. There is a gap between aspiration and reported progress for each project (Figures 4 and A1), and at the goal level (Figure 5). On average, just over a third of projects' initial objectives are being evidenced as having improved by the projects upon verification. Earlier examinations of REDD+ [33] reported that, relative to the monitoring of carbon stock and forest cover, measurement of co-benefits for REDD+ is still in its infancy. These findings suggest that whilst this is still the case for many REDD+ projects (at least from those reviewed here), some projects are demonstrating competent monitoring across far-reaching activities, but are currently failing to demonstrate where improvements have been made (Table 2). This gap is important. Whilst some changes take time to be realized, 80% of our projects had been in operation for over three years at their most recent verification. It might be hoped that, in this time, improvement could be demonstrated in some of the monitoring variables identified. Thus, we deem the aspiration–performance gap to be indicative of missed opportunities in REDD+ projects, that need to be appropriately addressed by project proponents, as well as those responsible for setting standards and monitoring performance against these standards.

Financial constraints likely play a role in creating this gap: project proponents often face a trade-off between investing funds in actually delivering social and environmental improvements, as opposed to investing resources into monitoring. This resonates with our observation (Section 2.4) that SDG-relevant activities are likely to be under-reported by project proponents. While this is probably true, most project proponents are also likely to be aware that, without explicit monitoring of progress against baselines or without project scenarios, they cannot credibly claim that they have been delivering real improvements. Some level of investment in measuring performance, thus, is likely to be important for projects to demonstrate their wider achievements across a range of social and environmental indicators.

Another important constraint of the present analysis is the short time period that has elapsed since the start of most of the projects currently under review, we acknowledge that some SDG-related parameters (especially those relating to institutional and social change) will only show real improvements in generational timescales, as opposed to the annual/biennial timescales that are visible in current verifications and monitoring reports. But, even where it is more appropriate to expect change to be visible over longer periods, monitoring metrics are important to allow baselines to be established, so that real improvement can eventually be evidenced. Reflecting this, the scoring system utilized here rewards projects that have identified monitoring variables, compared to those that have not.

The analysis also shows which goals are most frequently targeted, and which are the least frequently. Global Goals 4 (Education) and 12 (Sustainable production and Consumption) are highly targeted and demonstrate the highest improvement amongst all projects. Goals 3, 7, and 14 are targeted by fewer projects, but the most notable gap between aspiration and improvement is visible in Global Goals 7 (Clean Energy), 10 (Equality), and 13 (Climate Change). This analysis has not sought the 'best'

REDD+ project, nor is there a presumption that addressing a wider range of SDG targets is necessarily an indication of a 'better' project. The projects reviewed have been in operation for different periods of time, so it is unsurprising that they differ in their progress. However, it is important to identify where and how projects have been able to provide strong evidence of improvement, to suggest how projects might better support the global development agenda, and to provide independently verified evidence of their progress towards the global goals.

The CCB has recently introduced a monitoring template [34,35] that is designed for project proponents, to help them highlight important project benefits according to standardized benefit metrics. We find that the two strongest scoring projects (projects 11 and 12) are verified using the CCB's recently introduced CCB/VCS Monitoring Report template, which offers some standardized monitoring metrics to proponents, some of which are strong correlates to the SDGs—including improved access to, and quality of, healthcare (Global Goal 3), education (Global Goal 4), and clean water (Goal 6). These projects are not the only ones to use the new template, nor does it require that all the suggested variables be monitored—hence, it should not be seen as a prerequisite for success. It does, however, provide a reporting framework that is consistent and comparable across a wide range of local interventions. All CCB projects will be expected to monitor the same quantifiable information when they undergo their next rounds of verification. We might expect that an eventual programme-wide rollout of the template across all VCS/CCB projects will encourage more proponents to engage in astute monitoring and targeted activities, generating positive SDG outcomes. It might also facilitate future comparison between the relative achievements of different projects.

4.4. Policy Implications

This analysis places strong emphasis on the need for clearly articulated and measurable targets as a key element of successful project implementation, which corresponds with other investigations of conservation outcomes [25,36]. The introduction of the monitoring template for REDD+ proponents marks a step in the right direction to ensuring that projects generate lasting co-benefits, and by directing needed attention towards critical fields. Currently, however, relatively few SDG targets are mandatory in the existing CCB criteria. Since CCB does not require that specific variables are monitored, closing the gap between aspiration and improvement relies upon motivated, responsible proponents who go beyond the minimum reporting requirements for certification. Despite this, our findings suggest that REDD+ projects already target a diversity of SDGs beyond what is required by the CCB Standards. Whilst some projects are making demonstrable improvements in the SDG fields, many projects' objectives remain abstract aspirations, or else isolated accounts of project activities that are unable to systematically indicate progress towards these targets. It seems that while REDD+ could be a vehicle to elicit strong positive change in vulnerable communities, these opportunities are currently being missed—projects with high aspirations are not delivering real co-benefits (or at least not monitoring and reporting these under the CCB Standards). This is not a criticism of the programme itself, but the process of reporting and monitoring, which is potentially missing an opportunity to provide proponents a structure for demonstrating their progress towards the Global Goals.

If the CCB and other safeguarding frameworks were to broaden and tighten REDD+ performance criteria in synergy with the SDGs, the opportunities that REDD+ offers to support global development—that are currently being missed—might be better fulfilled. This might involve introducing more obligatory standardized metrics into the new monitoring template, which align with the entire spectrum of SDG targets, and rewards for project proponents that engage with these metrics. CCB validation criteria could potentially require proponents to describe why certain Global Goals are not being supported—recognizing that in many cases this will be because it is inappropriate, or not relevant to the project zone communities. We are not arguing that it is the responsibility of REDD+ proponents to tackle all aspects of the contemporary global development agenda; clearly, individual project-level forest sector interventions cannot realistically address the entire range of issues that the SDGs identify as global priorities. However, such an approach to reporting

and monitoring under the CCB, which encourages REDD+ alignment with the SDGs, could maintain a degree of programmatic flexibility, while also incentivizing proponents to actively engage with the global development agenda, as is appropriate to local needs and contexts.

5. Conclusions

This paper has used the Sustainable Development Goals as an evaluative framework to assess the aspirations and achievements of REDD+ projects under the CCB Standards to positively support broader global development agendas. Our analysis suggests that safeguards, such as the CCB, which seek to alleviate concerns for social and environmental justice relating to REDD+, are currently potentially too narrow in their expectations and monitoring requirements, thereby missing an important opportunity for greater alignment of REDD+ activities with the SDGs. Our analysis shows that REDD+ project proponents aspire to address a much wider range of social and environmental issues than what is currently required under the CCB Standards. Thus, such safeguards are falling short in their requirements (or lack of) for project proponents to demonstrate progress towards these stated aspirations. Our analysis reveals a gap between what projects aspire to, and what is reported as being improved upon in project implementation documents. More stringent performance reporting criteria, relating to the full range of SDGs targets, could be imposed upon proponents by safeguarding frameworks like CCB, and to facilitate more effective documentation of evidence for the delivery of positive co-benefits of REDD+ in support of broader development agendas.

Author Contributions: Conceptualization, C.M. and B.V.; Methodology, C.M and B.V.; Software, Microsoft Excel 365 and R.; Validation, C.M., D.C., and B.V.; Formal Analysis, C.M.; Investigation, C.M.; Resources, VCS Project Database.; Data Curation, in-depth content analysis, Microsoft Excel 365 and R; Writing—Original Draft Preparation, C.M.; Writing—Review & Editing, C.M., D.C. and B.V.; Visualization, C.M., D.C. and B.V.; Supervision, B.V.; Project Administration, D.C. and B.V.; Funding Acquisition, CCI Collaborative Fund. Authorship is limited to those who have contributed substantially to the work reported.

Funding: This research was funded by the Cambridge Conservation Initiative (CCI) Collaborative Fund.

Acknowledgments: The authors gratefully acknowledge all those involved with the CCI Collaborative Fund, and colleagues of Permian Global, Flora and Fauna International, and the RSPB for their insight as REDD+ project proponents. Further thanks to Andrew Balmford of the University of Cambridge for his scholarly input at the early stages of the project.

Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, and in the decision to publish the results.

Appendix

Table A1. The 25 CCB-verified REDD+ projects reviewed in this analysis; project design documents and project implementation reports are made publicly available at http://www.vcsprojectdatabase.org/#/ccb. Projects were given unique IDs during the analysis.

CCB Project ID	Project Name	Region	Standards Edition	Gold Standard(s)	CCB Verifications
562	The Kasigau Corridor REDD Project—Phase I Rukinga Sanctuary	Africa	Second	Climate; Biodiversity	4
612	The Kasigau Corridor REDD Project—Phase II The Community Ranches	Africa	Second	Climate; Biodiversity	4
674	Rimba Raya Biodiversity Reserve Project	Oceania	Second	Climate; Community; Biodiversity	2
902	Kariba REDD+ Project	Africa	Second	Climate; Biodiversity	2
904	Reduced Emissions from Deforestation and Degradation in Community Forests—Oddar Meanchey, Cambodia	Asia	Second	Climate; Community; Biodiversity	1

Table A1. *Cont.*

CCB Project ID	Project Name	Region	Standards Edition	Gold Standard(s)	CCB Verifications
934	The Mai Ndombe REDD+ Project	Africa	Second	Climate; Biodiversity	2
953	The Paraguay Forest Conservation Project—Reduction of GHG emissions from deforestation and forest degradation in the Chaco—Pantanal ecosystem	Latin America	Second	Climate; Community; Biodiversity	1
958	BIOCORREDOR MARTIN SAGRADO REDD+ PROJECT	Latin America	Second	Climate; Community; Biodiversity	1
963	The Purus Project	Latin America	Second	Biodiversity	6
985	Cordillera Azul National Park REDD Project	Latin America	Second	Biodiversity	4
1112	The Russas project	Latin America	Second	Community	2
1113	The Valparaiso Project	Latin America	Second	Community	2
1168	Kulera Landscape REDD+ Program for Co-Managed Protected Areas, Malawi	Africa	Second	Climate; Community; Biodiversity	1
1175	Avoiding planned deforestation and degradation in the Valdivian Coastal Reserve, Chile	Latin America	Third	Biodiversity	1
1201	Gola REDD Project	Africa	Second	Climate; Biodiversity	1
1325	Mjumita Community Forest Project (Lindi)	Africa	Third	Climate; Community; Biodiversity	1
1340	Bale Mountains Eco-region REDD+ project	Africa	Third	Climate; Community; Biodiversity	1
1359	Isangi REDD+ Project	Africa	Second	Biodiversity	1
1382	The Envira Amazonia Project—A Tropical Forest Conservation Project in Acre, Brazil	Latin America	Third	Climate; Community; Biodiversity	1
1403	The Paraguay Forest Conservation Project—Reduction of GHG Emissions from Deforestation and Forest Degradation in the Parana Atlantic Ecosystem—Forest Protection in the La Amistad Community, San Rafael	Latin America	Second	Biodiversity	1
1408	Chyulu Hills REDD+ Project	Africa	Second	Climate; Community; Biodiversity	1
1477	Katingan Peatland Restoration and Conservation Project	Oceania	Third	Climate; Community; Biodiversity	2
1541	Lacondon—Forest for life REDD+ Project	Latin America	Third	Climate; Community; Biodiversity	1
1622	REDD+—Project for Caribbean Guatemala: The Conservation Coast	Latin America	Third	Biodiversity	1
1650	Reduced Emissions from Deforestation and Degradation in Keo Seima Wildlife Sanctuary	Asia	Third	Biodiversity	2

Table A2. Links between SDG targets and REDD+ CCB Standards criteria, as they appear in the Second and Third Editions of the CCB Standards. None of the 25 REDD+ projects reviewed by us were validated using First Edition criteria, so these criteria are excluded from the analysis. Acronyms used for CCB Standard are G = a general criterion (blue); B = related to biodiversity (green); CM = related to community; GL = a "gold level" criterion (yellow/gold); N/A = not applicable to Edition (grey).

SDGs Addressed	SDG Targets	Corresponding Criterion in CCB Standards	
		Edition 2	Edition 3
1 NO POVERTY	**1.5**: "build the resilience of the poor and those in vulnerable situations . . . "	**GL2.4**: "identify any marginalized and/or vulnerable Smallholders/Community Members . . . (demonstrate) that measures are taken to avoid, or when unavoidable to mitigate any such (negative) impacts."	**GL2.4**: "identify any marginalized and/or vulnerable Smallholders/Community Members . . . (demonstrate) that measures are taken to avoid, or when unavoidable to mitigate any such (negative) impacts."
4 QUALITY EDUCATION	**4.4**: "increase the number of youth and adults who have relevant skills . . . for employment . . . "	**G4.3**: "provide orientation and training for the project's employees and relevant people from the Communities . . . building locally relevant skills and knowledge to increase local participation in project implementation	**G3.9**: "provide orientation and training for the project's workers and relevant people from the Communities . . . building locally useful skills and knowledge to increase local participation in project implementation
5 GENDER EQUALITY	**5.5**: "Ensure women's full and effective participation and equal opportunities for leadership . . . "	**N/A**	**GL2.5**: "the project generates net positive impacts on the well-being of women and that women participate in or influence decision making"
8 DECENT WORK AND ECONOMIC GROWTH	**8.8**: "Protect labour rights and promote safe working environments . . . "	**G4.5**: "the project meets . . . applicable laws and/or regulations covering worker rights." **G4.6**: "assess situations . . . that pose . . . risk to worker safety . . . show how the risks will be minimized . . . "	**G3.11**: "the project meets . . . applicable laws and/or regulations covering worker rights." **G3.12**: "assess situations . . . that might arise through the implementation of the project and pose . . . risk to worker safety."
10 REDUCED INEQUALITIES	**10.2**: " . . . promote the social, economic, and political inclusion of all . . . "	**N/A**	**GL2.6**: (demonstrate) "that Smallholders/Community Members have fully and effectively participated in defining . . . decision-making . . . and the distribution mechanism for benefit sharing . . . " **GL2.8**: "demonstrate that . . . (governance structures) enable full and effective participation of Smallholders/Community Members in project decision-making and implementation." **GL2.9**: "demonstrate how the project is developing the capacity of Smallholders/Community Members . . . to participate effectively and actively . . . "
10 REDUCED INEQUALITIES	**10.3**: "Ensure equal opportunity and reduce inequalities of outcome . . . "	**GL2.2**: "that poorer households . . . are likely to benefit substantially . . . " **GL2.3**: "that any barriers or risks that might prevent benefits going to poorer households have been . . . addressed . . . " **GL2.4**: "measures have been taken to identify any poorer and more vulnerable households . . . " **GL2.5**: "identify positive and negative impacts on poorer and more vulnerable groups . . . "	**GL2.4**: "Demonstrate that the project generates net positive impacts on . . . all identified marginalized and/or vulnerable Community Groups . . . " **GL2.5**: "the project generates net positive impacts on the well-being of women . . . " **GL2.6**: (demonstrate) "that Smallholders/Community Members have fully and effectively participated in defining . . . decision-making . . . and the distribution mechanism for benefit sharing"

Table A2. *Cont.*

SDGs Addressed	SDG Targets	Corresponding Criterion in CCB Standards	
		Edition 2	Edition 3
	**12.4**: "achieve the environmentally sound management of chemicals and all wastes . . . "	N/A	**B2.8**: "Describe the possible adverse effects of . . . fertilizers, chemical pesticides, biological control agents . . . " **B2.9**: "Describe the process for identifying, classifying, and managing all waste products . . . "
	**13.1**: "Strengthen resilience and adaptive capacity to climate-related hazards . . . " **13.b**: "promote mechanisms for raising capacity for effective climate change-related planning . . . "	**GL1.4**: "communities and/or biodiversity to adapt to the probable impacts of climate change."	**GL1.3**: "assist Communities and/or biodiversity to adapt to the probable impacts of climate change"
	**15.1**: "ensure the conservation . . . of terrestrial and inland freshwater ecosystems . . . " **15.2**: "promote the . . . sustainable management all types of forest . . . " **15.5**: "reduce the degradation of natural habitats, halt the loss of biodiversity . . . "	**B1**: (including) "project must generate net positive impacts on biodiversity within the project zone . . . " **B2.2**: "Document how the project plans to mitigate . . . negative offsite biodiversity impacts . . . "	**B2.2**: "Demonstrate that the project's net impacts on biodiversity in the Project Zone are positive . . . "; **B2.3**: "mitigate negative impacts on biodiversity . . . " **B2.4**: "Demonstrate that no High Conservation Values are negatively affected . . . "
	**15.8**: "prevent . . . /reduce the impact of invasive alien species . . . "	**B1.3**: "show that no known invasive species will be introduced . . . "	**B2.5**: "show that no known invasive species are introduced . . . "
	**16.4**: "combat all forms of organized crime"	**G5.5**: "Identify any illegal activities that could affect the project's . . . impacts . . . describe how the project will . . . reduce these"	**G5.4**: "Identify any illegal activities that could affect the project's . . . impacts . . . describe measures . . . to reduce these"
	**16.5**: "reduce corruption and bribery . . . "	N/A	**G4.3**: "Provide assurance that the project proponent and any . . . entities . . . are not complicit in . . . corruption such as bribery"
	**16.6**: "Develop effective, accountable and transparent institutions . . . "	**G3.9**: "proponents must play an active role in distributing key project documents to affected communities and stakeholders"**G3.10**: "Formalize a clear process for handling unresolved conflicts and grievances . . . "	**G5.2**: "Demonstrate that . . . the Free, Prior, and Informed Consent has been obtained of those . . . affected by the project . . . through a transparent, agreed process."
	**16.7**: "Ensure responsive, inclusive, participatory and representative decision-making"	**G3.8**: "Document and defend how communities and other stakeholders . . . have been identified and have been involved in project design . . . "	**G3.6**: "Describe the measures needed and taken to enable effective participation, as appropriate, of all Communities . . . "
	**16.10**: "Ensure public access to information . . . "	**G3.9**: "proponents must play an active role in distributing key project documents to affected communities and . . . hold widely publicized information meetings . . . "	**G3.1**: "Describe how full project documentation has been made accessible to Communities . . . " **GL2.7**: "Explain how relevant and adequate information . . . has been communicated to Smallholders . . . "
	**16.b**: "enforce non-discriminatory laws and policies . . . "	N/A	**G3.7**: "ensure that the project proponent and all other entities involved in project design and implementation are not involved in or complicit in any form of discrimination . . . "
	**17.17**: "promote effective public, public-private, and civil society partnerships . . . "	**G4.2**: "If relevant experience islacking . . . demonstrate how other organizations will be partnered with to support the project . . . "	**G4.2**: "If relevant experience is lacking . . . demonstrate how other organizations are partnered with to support the project . . . "

Figure A1. The number of Sustainable Development Goals addressed in the project design documents of 25 REDD+ projects, compared to the number of SDGs that are monitored (=impact score 2) and improved (= impact score 3), based on the project implementation reports.

References

1. Kosoy, N.; Corbera, E. Payments for ecosystem services as commodity fetishism. *Ecol. Econ.* **2010**, *69*, 1228–1236. [CrossRef]
2. Khadka, M.; Karki, S.; Karky, B.; Kotru, R.; Darjee, K. Gender equality challenges to the REDD+ initiative in Nepal. *Mt. Res. Dev.* **2014**, *34*, 197–207. [CrossRef]
3. Parrotta, J.; Wildburger, C.; Mansourian, S. *Understanding Relationships between Biodiversity, Carbon, Forests and People: The Key to Achieving REDD+ Objectives. A Global Assessment Report Prepared by the Global Forest Expert Panel on Biodiversity, Forest Management, and REDD+*; International Union of Forest Research Organizations (IUFRO): Vienna, Austria, 2012; pp. 1–161.
4. UN-REDD. Safeguards—UN-REDD Programme Collaborative Online Workspace. Available online: https://www.unredd.net/knowledge/redd-plus-technical-issues/safeguards.html (accessed on 15 August 2018).
5. Schroeder, H.; McDermott, C. Beyond carbon: Enabling justice and equity in REDD+ across levels of governance. *Ecol. Soc.* **2014**, *19*. [CrossRef]
6. Sikor, T.; Cẩm, H. REDD+ on the rocks? Conflict over forest and politics of justice in Vietnam. *Hum. Ecol.* **2016**, *44*, 217–227. [CrossRef] [PubMed]
7. United Nations. Framework Convention on Climate Change. Available online: http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf (accessed on 15 August 2018).
8. Clements, T. Reduced expectations: The political and institutional challenges of REDD+. *Oryx* **2010**, *44*, 309–310. [CrossRef]
9. Food and Agriculture Organization of the United Nations (FAO). *The State of the World's Forests 2018—Forest Pathways to Sustainable Development*; FAO: Rome, Italy, 2018.
10. Panfil, S.; Harvey, C. *REDD+ and Biodiversity Conservation: Approaches, Experiences and Opportunities for Improved Outcomes*; USAID-supported Forest Carbon, Markets and Communities (FCMC) Program: Washington, DC, USA, 2014.
11. Paladino, S.; Fiske, S. *The Carbon Fix: Forest Carbon, Social Justice, and Environmental Governance*; Routledge: Abingdon, UK, 2017.

12. Richards, M.; Panfil, S.N. *Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects: Part 1—Core Guidance for Project Proponents*; Climate, Community & Biodiversity Alliance, Forest Trends, Fauna & Flora International, and Rainforest Alliance: Washington, DC, USA, 2011.
13. Verified Carbon Standard. VCS Project Database. Available online: http://www.vcsprojectdatabase.org/#/ccb-verified (accessed on 15 August 2018).
14. Cadman, T.; Maraseni, T.; Ma, H.O.; Lopez-Casero, F. Five years of REDD+ governance: The use of market mechanisms as a response to anthropogenic climate change. *For. Policy Econ.* **2017**, *79*, 8–16. [CrossRef]
15. Myers, R.; Larson, A.M.; Ravikumar, A.; Fowler, L.F.; Yang, A.; Trench, T. Messiness of forest governance: How technical approaches suppress politics in REDD+ and conservation projects. *Glob. Environ. Chang.* **2018**, *50*, 314–324. [CrossRef]
16. United Nations. The Sustainable Development Goals and Targets. Available online: http://17goals.org/wp-content/uploads/2017/04/SDGs_17Goals_StudyEdition_v2b.pdf (accessed on 15 August 2018).
17. Stafford-Smith, M. UN sustainability goals need quantified targets. *Nature* **2014**, *513*, 281. [CrossRef] [PubMed]
18. Stokstad, E. Sustainable goals from UN under fire. *Science* **2015**, *347*, 702–703. [CrossRef] [PubMed]
19. Waage, J.; Yap, C.; Bell, S.; Levy, C.; Mace, G.; Pegram, T.; Unterhalter, E.; Dasandi, N.; Hudson, D.; Kock, R.; et al. Governing the UN Sustainable Development Goals: Interactions, infrastructures, and institutions. *Lancet Glob. Health* **2015**, *3*, e251–e252. [CrossRef]
20. Timko, J.; Le Billon, P.; Zerriffi, H.; Honey-Rosés, J.; de la Roche, I.; Gaston, C.; Sunderland, T.; Kozak, R. A policy nexus approach to forests and the SDGS: tradeoffs and synergies. *Curr. Opin. Environ. Sustain.* **2018**, *34*, 7–12. [CrossRef]
21. UN-REDD. Fact Sheet 1: About REDD3. (ebook). 2016. Available online: https://www.unredd.net/documents/redd-papers-and-publications-90/un-redd-publications-1191/fact-sheets/15279-fact-sheet-about-redd.html?path=redd-papers-and-publications-90/un-redd-publications-1191/fact-sheets (accessed on 15 August 2018).
22. InfiniteEARTH. Rimba Raya Initiatives and Matching UN SDGs, 2016. Available online: http://rimba-raya.com/wp-content/uploads/Rimba-Raya-Initiatives-UN-SDGs-2016.pdf (accessed on 15 August 2018).
23. Schreckenberg, K.; Camargo, I.; Withnall, K.; Corrigan, C.; Franks, P.; Roe, D.; Scherl, L.M.; Richardson, V. *Social Assessment of Conservation Initiatives: A Review of Rapid Methodologies*; Natural Resource Issues: London, UK, 2010.
24. Isyaku, U.; Arhin, A.; Asiyanbi, A. Framing justice in REDD+ governance: Centring transparency, equity and legitimacy in readiness implementation in West Africa. *Environ. Conserv.* **2017**, *44*, 212–220. [CrossRef]
25. Panfil, S.; Harvey, C. REDD+ and biodiversity conservation: A review of the biodiversity goals, monitoring methods, and impacts of 80 REDD+ projects. *Conserv. Lett.* **2015**, *9*, 143–150. [CrossRef]
26. Climate, Community and Biodiversity Alliance (CCBA). *Climate, Community and Biodiversity Project Design Standards*, 1st ed.; CCBA: Washington, DC, USA, 2005.
27. Climate, Community and Biodiversity Alliance (CCBA). *Climate, Community and Biodiversity Project Design Standards*, 2nd ed.; CCBA: Arlington, VA, USA, 2008.
28. Climate, Community and Biodiversity Alliance (CCBA). *Climate, Community and Biodiversity Standards*, 3rd ed.; CCBA: Arlington, VA, USA, 2013.
29. Pahuja, N.; Rai, A. *SDG Footprint of Asian NDCs: Exploring Synergies between Domestic Policies and International Goals*; The Energy and Resources Institute: New Delhi, India, 2017.
30. Kapos, V.; Balmford, A.; Aveling, R.; Bubb, P.; Carey, P.; Entwistle, A.; Hopkins, J.; Mulliken, T.; Safford, R.; Stattersfield, A.; et al. Outcomes, not implementation, predict conservation success. *Oryx* **2009**, *43*, 336–342. [CrossRef]
31. Organisation for Economic Cooperation and Development (OECD). *Measuring and Managing Results in Development Co-Operation: A Review of Challenges and Practices among DAC Members and Observers*; OECD: Paris, French, 2014.
32. Flora & Fauna International Conservation Report 2014–2015—Based on 2014 Annual Reports. Flora & Fauna International: Cambridge, UK, 2015. Available online: http://www.fauna-flora.org/wp-content/uploads/Conservation-Report-2014-2015_final.pdf (accessed on 15 August 2018).

33. Visseren-Hamakers, I.; Gupta, A.; Herold, M.; Peña-Claros, M.; Vijge, M. Will REDD+ work? The need for interdisciplinary research to address key challenges. *Curr. Opin. Environ. Sustain.* **2012**, *4*, 590–596. [CrossRef]
34. Climate, Community and Biodiversity Alliance. CCB & VCS Monitoring Report Template 3.0, 2017. Available online: http://verra.org/project/vcs-program/rules-and-requirements/ (accessed on 20 September 2018).
35. Climate, Community and Biodiversity Alliance. CCB & VCS Monitoring Report Template 2.0, 2017. Available online: http://verra.org/project/vcs-program/rules-and-requirements/ (accessed on 20 September 2018).
36. Margoluis, R.A.; Salafsky, N. *Measures of Success: Designing, Managing and Monitoring Conservation and Development Projects*; Island Press: Washington, DC, USA, 1998.

Amazon Fund 10 Years Later: Lessons from the World's Largest REDD+ Program

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Received: 27 December 2018; Accepted: 26 February 2019; Published: 19 March 2019

Abstract: Results-Based Funding (RBF) for Reducing Emissions from Deforestation and Forest Degradation (REDD+) has become an important instrument for channeling financial resources to forest conservation activities. At the same time, much literature on conservation funding is ambiguous about the effectiveness of existing RBF schemes. Many effectiveness evaluations follow a simplified version of the principal-agent model, but in practice, the relation between aid providers and funding recipients is much more complex. As a consequence, intermediary steps of conservation funding are often not accounted for in effectiveness studies. This research paper aims to provide a nuanced understanding of conservation funding by analyzing the allocation of financial resources for one of the largest RBF schemes for REDD+ in the world: the Brazilian Amazon Fund. As part of this analysis, this study has built a dataset of information, with unprecedented detail, on Amazon Fund projects, in order to accurately reconstruct the allocation of financial resources across different stakeholders (i.e., governments, NGOs, research institutions), geographies, and activities. The results show that that the distribution of resources of the Amazon Fund lack a clear strategy that could maximize the results of the fund in terms of deforestation reduction. First, there are evidences that in some cases governmental organizations lack financial additionality for their projects, which renders the growing share of funding to this type of stakeholder particularly worrisome. Second, the Amazon Fund allocations did also not systematically have privileged the municipalities that showed the recent highest deforestation rates. rom the 10 municipalities with the higher deforestation rates in 2017, only 2 are amongst the top 100 receiving per/Ha considering the 775 municipalities from Legal Amazon. Third, the allocation of the financial resources from the Amazon Fund reflects the support of different projects that adopt significantly diverging theories of change, many of which are not primarily concerned with attaining further deforestation reductions. These results reflect the current approach adopted by the Amazon Fund, that do not actively seek areas for intervention, but instead wait for project submissions from proponents. As a consequence, project owners exert much influence on to the type of activities that they support how deforestation reduction is expected to be attained. The article concludes that the Amazon Fund as well as other RBF programs, should evolve over time in order to develop a more targeted funding strategy to maximize the long-term impact in reducing emissions from deforestation.

Keywords: REDD+; Amazon Fund; Results-Based Funding; benefit distribution; resource allocation; climate change funding; effectiveness; forest conservation funding

1. Introduction

The international allocation of funds to activities intended to funding forest conservation—directly or indirectly—is said to be a "highly cost-effective way of reducing greenhouse gas emissions on climate change" [1]. Among many types of financial mechanisms for pursuing this approach, Results-Based Funding (RBF) for Reducing Emissions from Deforestation and Forest Degradation (REDD, or REDD+ for a broader suite of activities) has become an important instrument for channeling financial resources to forest conservation activities [2,3]. RBF can be defined as the "transfer of money or material goods conditional upon taking a measurable action or achieving a predetermined performance target" [4–7]. The success of RBF instruments for REDD+ stems from political controversies related to initial REDD+ proposals that favored offset-based markets [8]. Brazilian government, in particular, has been known to challenge the use of markets on the basis of sovereignty concerns [6,9]. Instead, Brazil created the Amazon Fund in 2008 in order to receive results-based payments for achievements in deforestation reductions [10], which plummeted between 2004 and 2012 [11–13]. Similar developments have also occurred in international forest governance debates, as the Green Climate Fund became the central financial instrument for REDD+ [14], testifing the growing prevalence of RBF approaches in forest governance. Despite this dominance, the effectiveness of RBF has been challenged by scholars [5,7,15–18], while others have showed that donor and receiving countries and stakeholders often disagree on how to best evaluate these schemes and distribute the resources [19,20].

This research paper aims to enhance the understanding of intermediary stages of RBF for forest conservation by reconstructing the allocation of financial resources from the Brazilian Amazon Fund to individual projects and analyzing the underlying rationales behind this allocation. Between 2008 and 2017, the Amazon Fund has received more than USD 1.2 billion in donations, committed USD 667.3 million for the financial support of 96 approved projects, and thereby represents the largest and most longstanding RBF initiatives in forest governance worldwide [10,13,21]. An analysis of financial resource allocation could, therefore, provide important lessons on the intermediary stages of RBF (as Amazon Fund) to REDD+ and other conservation purposes. Our analysis exposes the underlying intervention logic (or 'theory of change') adopted for redistributing financial resources, which is useful for identifying the main factors for successful or failing forest conservation funding. The remainder of this paper proceeds as follows. Section 2 reviews the literature on related resource allocations, including the theories of change, criteria for resource allocation, benefit-sharing mechanisms, and impacts. Section 3 then outlines our approach and Section 4 presents data about the distribution of Amazon Fund resources. Section 5 concludes with our main findings and their implications for impact and policy making.

2. Aid Effectiveness and the Complex Relations between Service Providers and Service Users

Deforestation reduction [17,22] is a relatively recent trend in the broader context of development aid that has usually targeted health, education, or biodiversity conservation [16,23]. Although using the same model, the literature generally refers to aid as funding for REDD+ initiatives, since the former seems to be charity while the last is close to the climate change concepts, where developed countries should fund initiatives of forest conservation to offset their historical emissions [2].

Although this aid could come in many forms, RBF has become an increasingly appealing approach due to its simplicity from both the donor and receiver sides. On the donor side, the payments are done based on the measurement of a result already achieved, reducing substantially the transactional risk. On the receiver side, RBF promises the transfer of resources with "no strings attached" as countries are able to decide how best to invest the payments. Since receiving countries would want to receive an increasing volume of resources, they would be incentivized to invest the RBF proceedings in a way that reduces deforestation the most. A closer look, however, reveals that many of the issues that have plagued REDD+ and development aid more in general are still present in RBF, namely: benefit distribution, intervention design, and effectiveness.

One of the key design choices around REDD+ programs concerns the definition of "who needs to be involved, whose interests are at stake, and the expected co-benefits and required safeguards" [19]. Moreover, their discussion of approaches to reducing tropical forest degradation highlights the importance of contextualizing local realities, responding to new knowledge and experience, and incorporating the full complexity of forest loss and degradation, among others [24,25]. Many scholars have highlighted the issues of equitable sharing of net benefits from REDD+ projects (e.g., [26,27]). For instance, Luttrell, Loft, Fernanda Gebara, Kweka, Brockhaus, Angelsen, and Sunderlin [27] distinguish a number of possible rationales for the distribution of REDD+ benefits. They have emphasized: (1) actors with legal rights; (2) actors achieving reductions in emissions; (3) low-emitting forest stewards; (4) actors incurring the costs of REDD+ implementation; (5) effective facilitators of REDD+ implementation; and (6) the poorest actors. They note great variation in how implementing countries apply these rationales, implying that this is a function of context, project design and the beneficiaries (see also [8]). Some scholars find that "equity can have significant positive feedback on program outcomes and legitimacy over the longer term" [26,28,29]. According to Vatn and Vedeld [30], market-based approaches were found to be the most problematic among governance structures, since they do not address equity. These observations suggest a theme of providing equal opportunities to stakeholders. Yet rigorous analysis, and even comprehensive evaluations of net benefits and their distribution, are scarce, in part because of the way decisions are made about distributions of resources within and across REDD+ projects [19].

Another key aspect of RBF is the choice, by the receiving country, of the interventions that will be supported by the program. [27,31]. Weatherley-Singh and Gupta [32], for example, find that REDD+ activities must directly target the drivers of deforestation, such as forest fires and illegal logging, as well as structural drivers, such as changes in land tenure and land-use planning. However, they argue that not all drivers are considered, as most schemes do not address cattle ranching, corruption, roadbuilding, and/or commodity demands, among others (see also [9,33]). As important as the choice of the type of intervention is, the definition of the territories that will be prioritized by REDD+. Wolosin, Breitfeller, and Schaap [10] show that the geographical distribution of REDD+ finance can be largely explained by priorities on tree cover, tree-cover loss, and carbon emissions at national (70%–94%) and subnational (58%–72%) levels, though institutional capacity and political commitments have also been influential. Other work highlights significant gaps for specific priority areas. Some scholars point to areas in the Amazon region facing high deforestation pressure that are important for emissions and biodiversity [33–35]. Other scholars argue for additional investments in the network of protected areas, given their importance to date in curbing deforestation and the risks from deforestation dynamics [36,37]. Still others argue that support should also consolidate pristine or intact or stable forests to ensure long-term conservation (e.g., [35]). While the majority of available literature strongly emphasizes improved protection of high-risk areas, at the least for prioritizing additional impacts in the short run, various goals play parts within comprehensive approaches to forest conservation.

Finally, different studies have pointed out that it is not clear that RBF leads to the efficient use of resources, as initially assumed. The proponents of RBF expected that, since receiving countries have a direct financial incentive to reduce deforestation, they would strive to support actions on the ground that contribute directly to that aim. However, a closer look suggests that that empirical evidence on the effectiveness of RBF schemes is either lacking or points to contradictory effects [5], a problem already well known in relation to development aid [38]. On the one hand, authors such as Restivo, Shandra, and Sommer [17] argue that more bilateral aid from the United States Agency for International Development (USAID) has a lowering effect on forest loss. On the other hand, studies such as Hermanrud and de Soysa [22] report that forest conservation funding from Norway's International Forest and Climate Initiative (NICFI), one of the largest aid initiatives in the world and the main donor to the Amazon Fund, has had no effect in halting forest area loss. In a similar way, Bare, Kauffman, and Miller [18], for example, argue that forest conservation funding in sub-Saharan

Africa "is not associated with reduced deforestation rates at the national scale" and even claim that short-term impacts had negative effects. Both studies have strong limitations, since they do not control for other drivers of deforestation, such as agricultural prices, and they assume that relatively small-scale programs (as a percentage of the country's Gross National Product), are going to show effects at national level [39]. Nevertheless, these studies show that there is a growing concern with the effectiveness of RBF, in general and NICFI in particular.

The problem with evaluating the effectiveness of RBF initiatives is that the relations between service users (aid providers) and service providers (aid users) are much more complex than a simplified reading of the principal-agent model found in the studies cited above. According to Paul [7], the contracted agency relationship is often one between the donor organization and a recipient organization or ministry, whereas results may come from other organizations that ultimately spend the financial resources from these donations but have no direct relation with the donor organization (i.e., non-contracted agency relation). In this respect, for example, the UN-REDD+ programme from the United Nations Development Program (UNDP) supports 94 projects in Cambodia, Sri Lanka, Panama, Paraguay, Democratic Republic of the Congo, and Nigeria. However, UNDP are directly related only to the governmental focal point of each country, relating only indirectly with the local beneficiary [40].

According to Van der Hoff, Rajão and Leroy [19], the indirect relations between financial donations, 'project performance', and deforestation rates underlie discursive tensions between donor and recipient countries. While formally all parties agree that RPF should be based solely on deforestation reductions already achieved, donors are also increasingly concerned with the lack of evidence of efficiency of funded projects in driving additional reductions, and in this way fueling a virtuous circle. These tensions and conflicts suggest that the intermediary processes of forest conservation funding are poorly understood, particularly with respect to how they affect aid effectiveness. Some authors have suggested that addressing these conflicts requires new approaches to aid effectiveness evaluations that account for the complex relations of RBF for REDD+, particularly the intermediary stages of forest conservation funding. This could imply, for instance, that transfers should be conditional upon desired results, as within well-implemented payments for ecosystem services (PES) approaches [28]. Such conditions could also require environmental additionality—that is, providing more ecosystem services than they would provide in the non-existence of such payments [41,42]. In addition, REDD+ should be 'financially additional', beyond already planned funding [43]. While attractive, the idea of adding specific demands of additionality to RBF goes against the simplicity and 'hands off' approach that made RBF popular in the first place. Furthermore, this approach would entail a return of many elements of the project-based model defined by Verified Carbon Standard among others, which have also proven to be highly problematic [44]

The growing body of literature presented above presents valuable insights on how RBF should be designed and presents some of its dilemmas and contradictory results. But while allot has been said about how large RBF programs should look like, until recently we lacked a strong record of largescale schemes to look back and draw lessons from concrete experiences. This study provides the first comprehensive analysis of the first decade of the Amazon Fund, the world largest REDD+ RBF program [45,46]. Our study aims to reveal the design choices adopted by the Fund by analyzing its resource distribution across beneficiaries, activities, and geographies. While this study does not provide a quantitative impact analysis of the fund, it allows us to understand how the allocation of financial resources corresponds with various REDD+ design choices, as reflected in the available literature on REDD+, and the extent to which this may affect its long-term effectiveness. From this, this study draws lessons that could be used to improve the Amazon Fund in Brazil and other large RBF programs.

3. Research Approach and Methodology

This research paper conceptualizes the Amazon Fund as an intermediary organization that links the forest conservation funding provided by donor organizations to the individual projects

(see Figure 1). Created in 2008, the Amazon Fund was the first large scale RBF program to be implemented. As such, the fund played an important role in shaping the discussions around REDD+ at the United Nations Framework Convention on Climate Change (UNFCCC). For this reason, the UNFCCC's Warsaw Framework for REDD+ adopted, to a large degree, the modus operandi pioneered by Brazil. Financial donations to the Amazon Fund mainly come from Norway's International Climate and Forest Initiative (NICFI) and the German Development Bank (KfW). The Amazon Fund consists of a steering committee (COFA), which is responsible for establishing allocation guidelines, and a technical committee (CTFA), which is responsible for approving results in terms of reducing emissions from deforestation. The managing organization of the Amazon Fund is the Brazilian Development Bank (BNDES) and is responsible for the approval (or rejection) of submitted project proposals according to predefined guidelines, as well as for the receipt and allocation of financial resources. Since 2015, BNDES has also become eligible to receive financial resources from the Green Climate Fund (decree 8.576/15), whereas other organizations like the government-owned bank Caixa Econômica Federal (CEF) and the Brazilian Biodiversity Fund (FUNBIO) may also become recipients. Financial resources are allocated to a wide variety of organizations. Federal government organizations include the Brazilian Agricultural Research Corporation (EMBRAPA), the Brazilian Institute for Space Research (INPE), the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA) and the National Police Force (FNSP). Non-governmental organizations also abound and include the Sustainable Amazon Foundation (FAS), the Amazon Institute for Human and Environment (IMAZON), Amazon Environmental Research Institute (IPAM), and The Nature Conservancy (TNC), among others. State government organizations are mostly represented by the environmental or agricultural secretariats of the nine Brazilian states in the Legal Amazon, while some state secretariats outside this region were also recipients. Finally, municipal government secretariats and federal universities were also supported financially by the Amazon Fund.

Understanding how forest conservation funding to the Amazon Fund contributes to the effective reduction of emissions from deforestation and forest degradation involves connecting the project activities (each with a specific shared benefit), geographies, and supported activities, to the overall objective of emissions reduction. The Amazon Fund already provides an annual report that divides the funding distribution according to four broad categories: (1) monitoring and control, (2) land tenure regularization, (3) sustainable production, and (4) scientific and technological development [13]. However, to understand the allocation of financial resources in light of the design outlined above, it is necessary to further refine the available information from the Amazon Fund. For this purpose, we have built a project database with detailed information on the beneficiaries, activities and geographies that received financial resources from the Amazon Fund (see Figure S8 in Supplementary Materials).

Our primary data source is the Amazon Fund´s website, as well as its annual activity reports (see Figures S3 and S6 in Supplementary Materials). We collected all data available on all of the 96 projects that received support between 2008 and 2017. This data includes project objectives, beneficiaries, implementing organization, territorial scope, committed and disbursed amounts, and activities conducted, among other information. Websites of project owners provided additional information. To refine the data for providing geographical information, we used the municipality as the entity. In Brazil, municipalities reflect the smallest geographical unit for monitoring deforestation, applying public policies, allocating government resources, and evaluating (see Tables S1 and S2 in Supplementary Materials).

One of the main challenges of generating data at the municipal level is the variation of project target areas, which may involve biomes, river basins, protected areas, or indigenous territories. Based on the available literature, we designed rules to determine the municipalities encompassed by each project (see Figure S5 and Tables S3 and S4 in Supplementary Materials). When project disbursements covered multiple municipalities, we used a weight factor in order to determine the share of financial support that each municipality received (see Figure S7 in Supplementary Materials). After the geographical allocation of financial resources, we further categorized the dataset

by main-component, which reflects the Amazon Fund´s theory of change. As projects may contribute to multiple main-components, we conducted one interview by email with a BNDES manager, the managing organization of the Amazon Fund, who replied with a spreadsheet including data dividing the investments of each Amazon Fund project by main-component. Finally, we further categorized the dataset by activity (also called specific-components). As a main-component can be composed by multiple activities, if more than one activity by main-component was verified, then the amounts were equally divided across them. The assumptions in response at divergences or limitations of data collected are presented at Figure S6 in Supplementary Materials. The final database contains 10,493 lines of information structured by project, location, main-component, and specific-component (see Figures S1, S4 and S8 in Supplementary Materials). The procedures for collecting and interpreting data, and constructing the database, are detailed in the supplements outcomes (see Figure S2 in Supplementary Materials). The Amazon Fund accountability is in Brazilian Reais currency. All financial data were converted from Brazilian reais to US dollars by using the rate for the day they were received, which corresponds with the methodology used for the English publications of the Amazon Fund. To evaluate the additionality of the Brazilian governmental agencies budgets (accountable in Brazilian reais) with the Amazon Fund disbursements, we used an average exchange rate between 2009 and 2017, in order to reduce the effects of exchange rate fluctuation.

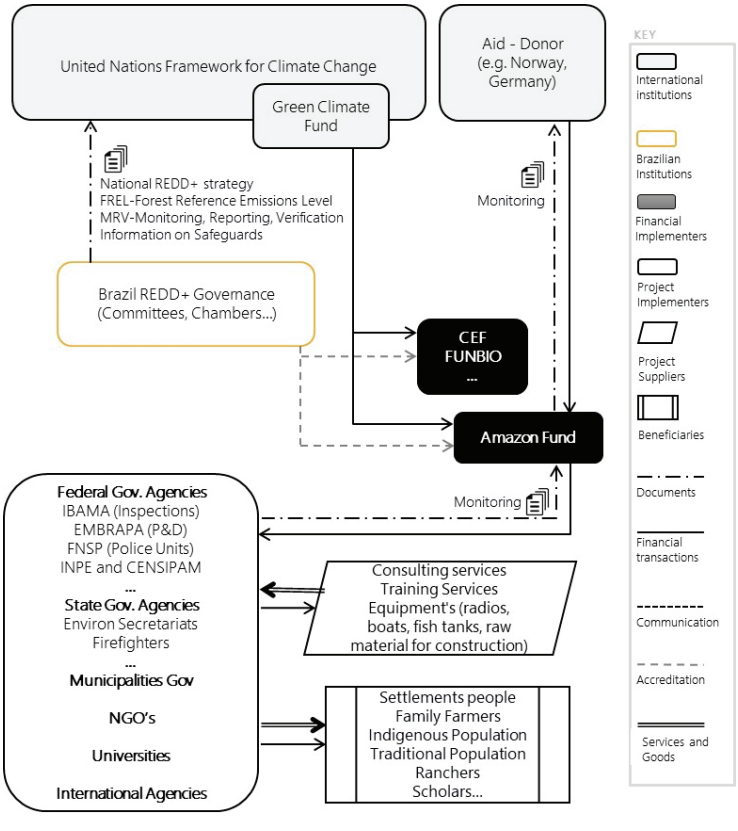


Figure 1. The Flows of Amazon Fund. Redd, Reducing Emissions from Deforestation and Forest Degradation; CEF, Caixa Econômica Federal; FUNBIO, Brazilian Biodiversity Fund; IBAMA, Brazilian Institute for the Environment and Renewable Natural Resources; EMBRAPA, Brazilian Agricultural Research Corporation; FNSP, National Police Force; INPE, Brazilian Institute for Space Research; CENSIPAM, Center for the Management of the Amazon Protection System.

4. Results: Resource Allocations by the Amazon Fund

Currently, the approval of projects and disbursements are made on the basis of criteria and guidelines updated biannually by COFA. The 2017–2018 document lists 14 minimum requirements that potential projects must meet, some (i.e., items B4, B5, B6, B7, and B14) determining conceptual boundaries of project activities. Projects also must demonstrate coherence with environmental and forest policies, most notably the national Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm), including its manifestations in state governments (PPCDs), and the national policy for Regenerating Native Vegetation (ProVeg) [13]. Projects are also evaluated with respect to coherence with Brazil's National REDD+ Strategy (ENREDD+), which in turn incorporates implementation of PPCDAm and compliance with the Brazilian Forest Code. Finally, projects are expected to be financially additional, i.e., to go beyond existing public environmental budgets and other forms of finance.

The Amazon Fund maintains an open channel for submissions indicating that 80% for the resources should be invested in the Amazon biome (an area that encompasses 40% of the country). In addition to that, the fund also has made public calls aiming at fostering specific activities, such as sustainable production, inclusive value chains and the management of indigenous lands. These calls account for 8.4% of the resources committed by the fund by December 2017. A recent call for forest restauration from 2017 added a spatial priority criteria that provides up to 12 points (from a total of 100) if the project is located in a high priority water basin within a municipality blacklisted as a top priority for deforestation control by the Ministry of Environment [47]. In both the calls and the open submission channel, however, the Amazon Fund adopts largely a passive approach, waiting for project owners to send proposals, rather than actively identifying areas under high risk of deforestation where the impact of the resources would be maximized in terms of deforestation reduction.

4.1. Benefit Distribution Across Stakeholders

The distribution of financial commitments across stakeholders shows some variation across years (Figure 2, left panel). In 2017, over 95% of a total of USD 667.3 million went to state governments (USD 256.6 million) or NGOs (USD 241.1 million) or federal governments (USD 140.6 million), with their shares varying considerably per year. Of a total of USD 140.4 million in 2013, about 70% (or USD 102.9 million) went to projects of state governments that received almost no such commitments either two years earlier or two years later. This peak took place as a consequence of a change in the rule of the Amazon Fund that allowed the approval of larger "structural projects", as the implementation of the Rural Environmental Register (CAR). By contrast, commitments to NGOs projects were relatively stable over time, averaging USD 22 million until 2016, though rising to USD 44.5 million in 2017 (implying variation in the NGOs' share). Commitments to federal government projects were also uneven, with slight peaks in 2012 and 2017 (USD 31.7 million, 41.2 million).

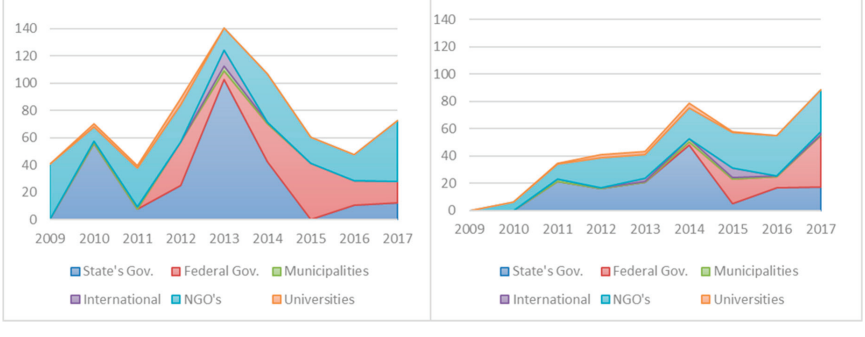


Figure 2. Annual committed (**L**) and disbursed (**R**) amounts per stakeholder (in million USD).

However, the ability of different stakeholders to approve projects with the Amazon Fund did not match their implementation capabilities. In the last decade, only USD 405.3 of 667.3 million (i.e., 60.7%) has been transferred to project owners. Average annual disbursements to state governments have hovered between USD 16 and 21 million in most years, with a sudden peak of USD 47.6 million in 2014 and then a sharp drop to USD 4.8 million in 2015. Disbursements to federal government increased exponentially from a small base of only USD 2.4 million even in 2014 to USD 37.7 million in 2017. Finally, disbursements to NGOs steadily increased from USD 6.4 million in 2010 to USD 30.7 million in 2017. From these three groups of beneficiaries, the Federal Government has been demonstrated the largest implementation gap, starting with a very low implementation rate and reaching the execution of only 47% of the committed values by 2017. This was followed by the State Governments, whose spending rates stayed below 50%. Municipalities, Universities, and NGOs, in contrast, presented a better implementation capacity, being able to invest most of the resources obtained from the Fund.

To understand these variations in disbursements, we must also consider the characteristics of the projects supported by the Fund. Federal government projects, for instance, were concentrated within eight projects involving six recipient agencies. Of the total amounts in this category, USD 64.3 million (i.e., 47.2%) went to organizations that develop satellite-based monitoring systems and provide information on deforestation trends, namely INPE and CENSIPAM. Another USD 35.9 million (i.e., 26.7%) went to organizations responsible for enforcing environmental laws and policies, namely IBAMA and FNSP. The remaining USD 40.5 million (i.e., 25.9%) went to EMBRAPA units to disseminate knowledge about sustainable production and the recovery of degraded areas throughout Brazil, and to the Brazilian Forest Service (SFB) for the collection of information aiming to increase the forest data available (see Section 4.3). While the IBAMA manage to invest 17.5% of the funds received, by 2017, INPE and CENSIPAM used only 58.6%, implying that the development of a radar-based monitoring system is lagging behind schedule.

The committed and disbursed peaks for state government projects in 2013 and 2014 (Figure 3) correspond with contextual factors as well, including a surge in state government projects toward development and implementation of the Rural Environmental Register (CAR). CAR is a federal policy instrument introduced in 2012, with the adoption of the new Forest Code (law 12.651/2012), to enhance law enforcement capacity. However, despite the federal law and a centralized national system, the registers must be executed at state or municipal level (art 29, §1). CAR implementation has, therefore, become a major concern for state governments, especially after the system went live in 2014 [48]. This can be seen in both spending and appeals to the Amazon Fund [13]. Within the 13 states that have approved projects, 85% of disbursements went to seven of the nine inside the Amazon Biome.

The linear increase in disbursements to NGOs reflects yet another set of contextual factors, in this case related to Amazon Fund process adjustments over time. Disbursements to projects were slow, to start, due to rigid assessment procedures intended to show professionalism; in the eyes of donor organizations and BNDES management, that slowness also reflected some lack of understanding of project owners [13,19]. Minutes of COFA meetings indicate that, in response to these challenges, the Amazon Fund adopted a number of measures in order to facilitate and accelerate the disbursement process, including public calls for submitting project proposals. While the consequences of these responses are reflected in the linear increase in approved projects and disbursements to NGOs, 80% of the financial resources were concentrated in half of the NGOs that received support from the Amazon Fund. While the Amazon Fund does include distributional equity amongst its performance criteria, this concentration reveals that usually only high-capacity and professional civil society organizations, such as FAS, IMAZON, and TNC, are able to access the fund (see Figure S9 in Supplementary Materials).

In addition to exposing the implementation capability of different governmental agencies, a comparison between the disbursement of the Amazon Fund with the yearly government budget also reveals the ability of the Fund to foster additional actions. One of the key principles of the first donation contract signed in 2008 between Norway and Brazil was the warrant that the Amazon Fund

would not replace but supplement tax payer funds [2,20,22,49]. However, it is possible to observe that the increases in disbursements to federal agencies coincided with their decreasing governmental budgets, particularly after 2014 (Figure 4). This suggests the occurrence of a partial substitution for the agency expenditure of taxpayer-funded budgets using the Amazon Fund. For instance, IBAMA's committed budgets to reduce deforestation, combat fires, and conduct environmental inspections have been reducing since 2012, with a strong reduction from USD 50.64 million in 2014 to USD 29.07 million in 2017. These reductions have been partially offset by Amazon Fund disbursements starting in 2015. Similarly, INPE´s budget fell from USD 84.5 million in 2010 to USD 43.63 million in 2017, 2017, and CENSIPAM has also lost more than 70% of its governmental funding from 2009 and 2017. In those three cases, the Amazon Fund played an important role offsetting those budgetary losses from 2015 onwards, in the case of CENSIPAM even outmatching governmental funds. Those trends include rising implementation rates for turning federal commitments into disbursements, which increased from 3.7% in 2014 to 26.8% in 2017.

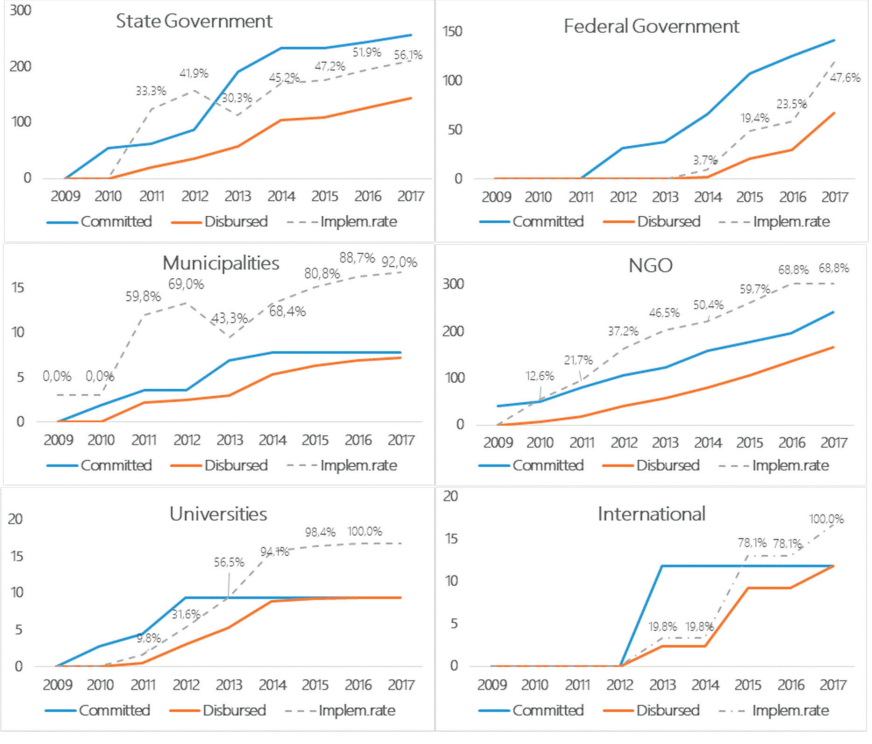


Figure 3. Implementation rates as disbursed, divided by committed (consolidated amounts), by Stakeholder.

These observations cannot, by themselves, confirm a direct causal relationship between the increasing financial disbursements from the Amazon Fund and the decreasing budgets of the recipient federal agencies. Furthermore, it should be highlighted that the period following 2015 witnessed one of the worst political, economic, and fiscal crises in Brazil's history. At the same time, however, contextual factors seem to correspond with an interpretation that the forest conservation funding provided through the Amazon Fund lacks in some instances financial additionality, particularly considering the unfavorable political climate for environmental protection [50], the greater flexibility within forest

legislation since 2012 [51], multiple bills for reducing environmental protection during election year 2018, and, as a consequence of all these factors, rising deforestation rates since 2012 [52].

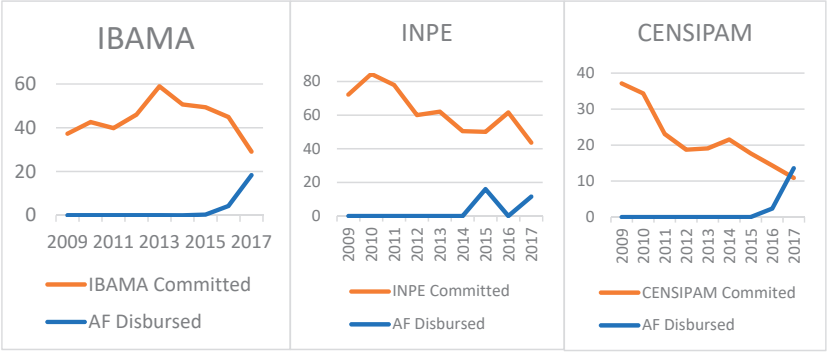


Figure 4. Comparison of Federal Committed Budgets with the Amazon Fund disbursements for INPE, IBAMA and CENSIPAM (used average 2009–2017 exchange rate: 2.434). Committed amounts represent the Portuguese term, 'Empenhado', an act that guarantees that there is an amount necessary to pay for an assumed commitment and creates a payment obligation for the government.

4.2. Geographical Distribution

Spatially, Amazon Fund allocations display a large concentration (Figure 5a) in 64 municipalities along the (Figure 5a) region stretching from the southeast of Pará towards the western regions in the Mato Grosso, Rondônia and Acre states, municipalities that contain, since 2000, the highest consolidated deforestation rates in Brazil. NGO and state projects explain much of this concentration (Figure 5b,c), whereas federal projects had no significant contribution, mainly due to their nationwide focus (Figure 5c,d). Federal government projects are the most evenly distributed across the landscape, averaging below 26 USD/ha, which could be due to the all-encompassing nature of the geographic information systems (GIS—Geographic Information Systems) and remote sensing activities that these projects tend to promote. At the same time, disbursements to larger federal agencies, such as EMBRAPA, tend to concentrate in eight cities in the Legal Amazon, including Rio Branco, Manaus, Boa Vista and Macapá, where these agencies are located (Figure 5d). Finally, while municipalities benefit indirectly from various types of support, direct support only went to 6 of the 772 municipalities in the Legal Amazon and amounted to only USD 7.8 million. Most of these resources (65.2%) went to the municipal government of Alta Floresta, in northern Mato Grosso. In addition, the Amazon Fund had also financed research of the state universities of Pará (in Belem) and Amazonas (in Manaus) as well as to the development of satellite-based monitoring systems by INPE in Manaus (Figure 5g).

State government projects are mostly responsible for monitoring and control (Figure 5c), particularly through activities, as the structuring of environmental secretariats, CAR implementation, and training of firefighters (see Section 4.3 for details). State governments that more actively sought the support of Amazon Fund for monitoring and control were Acre, Maranhão, Tocantins, and Rondônia. Particularly, Acre has a strong presence in investments in sustainable production, spread throughout its territory (Figure 5e,f). The distribution of resources also portrays low intensity towards Land Tenure Regularization activities, independent of the region or stakeholder (Figure 5h), However, the Amazon Fund allocations did not systematically privilege the municipalities that showed the recent highest deforestation rates. For instance, from the 10 municipalities with the highest deforestation rates in 2017, only two were amongst the top 100 receiving per/Ha, considering the 775 municipalities from Legal Amazon. Furthermore, the support from the Amazon Fund tend to arrive in a context in which clearings have already been reduced substantially due to other factors or the depletion of forests (see Table S5 and Figure S10 in Supplementary Materials). This spatial pattern of project distribution

confirms the apparent lack of strategy of the Amazon Fund, as a consequence of a largely passive approach that waits for proposals rather than actively seeking opportunities for fostering projects in areas with high deforestation risk.

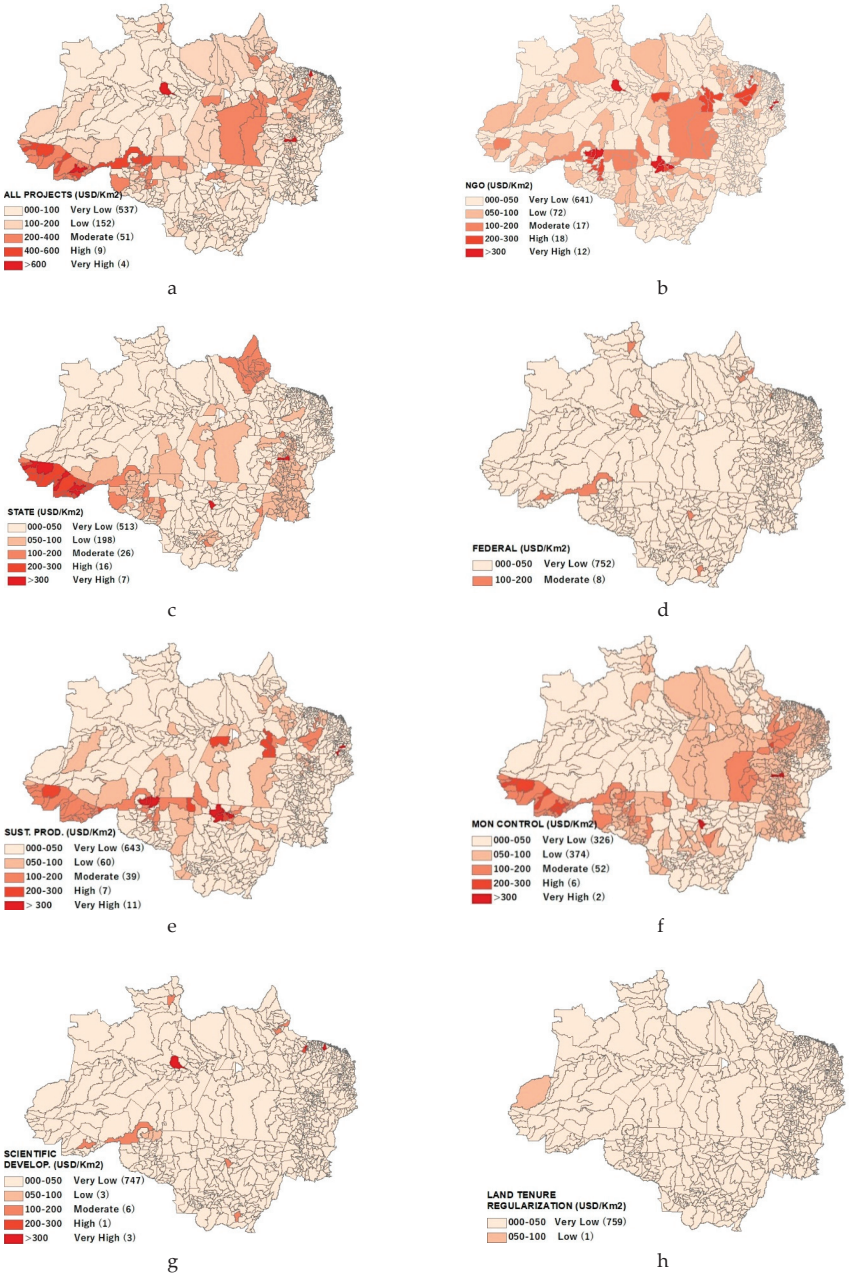
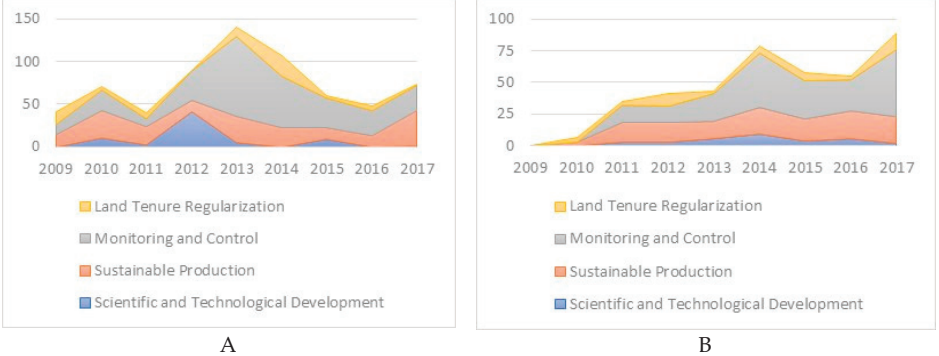


Figure 5. Spatial distribution of Amazon Fund investments per municipality by Stakeholder and by main-component.

4.3. Distribution Across Activities

Almost half of the total commitments (USD 667.3 million) has gone to monitoring and control (USD 326.7 million), while one third (USD 201.9 million) has gone to sustainable production (see Figure 6 and Table 1). The latter category has been relatively steady over time, as have the small land tenure commitments. By contrast, the large investment monitoring and control have been uneven over time: starting slow with an average of USD 20.3 million in the first four years, peaking in 2013 at USD 94.0 million, and then settling at an average of USD 30.6 million from 2015 on (Figure 6, left panel). Finally, nearly all commitments for scientific and technological development occurred in 2012 (USD 40.7 million).



A B

Figure 6. Annual committed (**A**) and disbursed (**B**) amounts per main-component (in millions USD).

Although slightly slower than noted above, actual disbursements to individual projects have corresponded to commitments, with most disbursements going to monitoring and control (49.6%) and sustainable production (31.9%). Monitoring and Control was responsible for most of the variation (see right graph of Figure 6), peaking in 2014 (USD 43.1 million) and 2017 (USD 53.5 million). Notably, disbursements for scientific and technological development have never gotten much traction, slightly peaking only in 2013 and 2014, and also presents the lowest implementation rate up to 2017 (Figure 7).

Monitoring and control efforts involved mostly state and federal government projects (USD 187.1 million and USD 100.1 million, respectively). It was the only category, though, that included the unique international project supported by the Amazon Fund, aiming to help develop the capacity to monitor deforestation in eight neighboring countries that also contain the Amazon biome (USD 11.8 million). However, most of the monitoring and control investments (USD 113.0 million) was allocated to CAR implementation. A large share of the funds provided for this activity (USD 102.5 million) was used by state governments to acquire equipment (GPS, computers, software) and provide training for effective processing of CAR proposals. Another share (USD 52 million) was invested in the capacity-building of environmental secretariats for CAR implementation and other environmental policies, including the creation of municipal secretariats, the acquisition of cars and buildings, the hiring of employees and training in-monitoring deforestation, landscape analysis, sustainable supply chains, and measurement. In addition, some resources were used to promote CAR among landowners and to provide georeferencing services for landowners. A small amount went to development of a state system for granting environmental licensing to new businesses and companies. Therefore, in total, 18% of the resources committed by the fund have been invested in the implementation of CAR.

Table 1. Distribution of project approvals to Amazon Fund projects (USD). CAR, Rural Environmental Register.

Activities	State Government	Federal Government	Municipal Government	International NGOs	Univ.	Total
Scientific and Technological Development	4.457.301	40.461.961		13.990.780	9.383.341	68.293.383
Field collection and data inventory (Forest, Socioeconomic, Biodiversity, Maps)	1.771.039	31.709.135		366.095		33.846.268
Disseminate Environmental Education (Museum)				5.818.209		5.818.209
Development of New Forest Products					732.695	732.695
Develop environmental diagnoses and shared management tools, edit bulletins and publications				1.693.133	4.736.591	6.429.724
Investment in research infrastructure (Laboratories, equipment, facilities, universities)	1.771.039			1.263.966	3.914.055	6.949.059
Research on the production of native seedlings and techniques for reforestation of degraded areas, development of Demonstration Units (pilots) to disseminate knowledge *	915.224	8.752.827		4.849.377		14.517.427
Sustainable Production Activities	41.186.376		5.984.174	154.736.705		201.907.255
Economic Activities for Sustainable Forest Use and Recovery of Degraded Areas	41.186.376		5.984.174	154.736.705		201.907.255
Monitoring and Control	187.105.638	100.146.294	1.788.272	11.791.988 25.845.426		326.677.619
Structuring and strengthening of State and Municipal Environment Secretariats (Acquire infrastructure, training in Monitoring deforestation, Landscape Analysis, Sustainable Chain and Recovery Measure techniques)	52.018.486		1.376.210	14.254.668		58.656.955
Inspections, Enforcement and Environmental Police		29.571.660				29.571.660
Combat Forest Fires (States–Firefighters/Federal–GIS and Satellites)	32.543.336	6.282.451				38.825.788
Regularize the environmental situation or/and implement CAR	102.543.816		412.062	11.590.759		113.007.430
Improve Deforestation Monitoring System (GIS and Satellites) **		64.292.183		11.791.988		76.084.171
Land tenure regularization	23.829.953		62.995	46.552.443		70.445.392
Land Regularization of Small and Middle size properties (Tenure, Deeds)	1.141.031			3.219.703		4.360.735
Territorial and Ecological Zoning, strengthening and empowerment of PA and IT Management	22.688.922		62.995	43.332.740		66.084.657
Total	256.579.269	140.608.255	7.835.441	11.791.988 241.125.355	9.383.341	667.323.649

** e.g., improving software; improving the services for receiving, distributing and using satellite images produced; map and make available tools to shape changes in the use of land; improving methods to estimate biomass and emissions; make available a solution for storing and processing a large volume of geospatial data, called "Brazil Data Cube", between others.

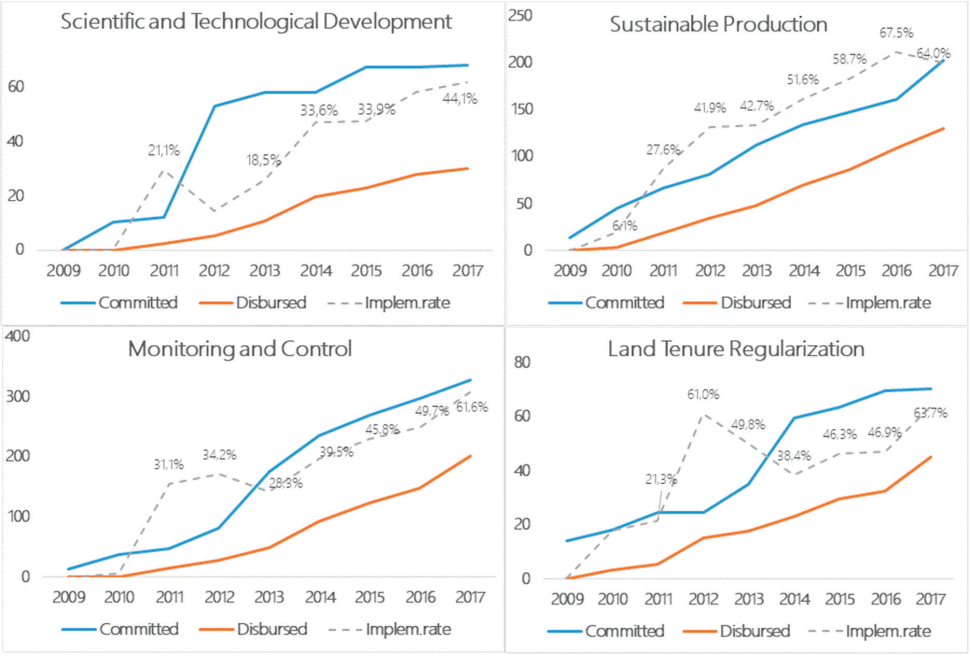


Figure 7. Implementation rates as disbursed divided by committed (consolidated amounts), by main-component.

Monitoring activities that were exclusively promoted by federal government organizations involved the improvement of satellite-based monitoring systems for fighting deforestation (PRODES—Annual Deforestation System and DETER—Real Time Deforestation System, USD 76.1 million) and forest fires (PREVFOGO-Fire Prevention System, USD 6.3 million). State governments also invested in forest fire combat (USD 32.5 million), but emphasized control activities (e.g., the creation of firefighter units), rather than monitoring activities. Other investments by federal government organizations targeted the strengthening of law enforcement (USD 29.6 million) in two projects by IBAMA and FNSP; this funding was mostly spent on the acquisition of vehicles, helicopters, equipment, and buildings. While NGOs received much financial support from the Amazon Fund (USD 241.1 million), their support for monitoring and control activities was relatively small (USD 11.6 million) and only involved CAR implementation.

In the category of sustainable production, resources mostly went to NGOs (USD 154.7 million) and state government organizations (USD 42.1 million) (see Table 1). Nearly all state government investments went to the promotion of sustainable forest activities, the acquisition of equipment (tanks, driers, processing units' machines, warehouses), and the provision of professional training and technical assistance (in pisciculture and aquaculture, nut and Açaí extraction, pasture management, as well as forestry and agroforestry systems). This result suggests that the social benefits from the Amazon Fund in terms of rural poverty reduction and sustainable farming were carried out mostly by NGOs and state governments.

Investments in regularizing land tenure, notably spending on territorial zoning and protected-area management and indigenous lands, came almost exclusively from state governments (USD 23.8 million) and NGOs (USD 46.6 million). This investment provides indirect benefits for indigenous peoples, quilombos (descendants from fugitive slaves), riverine people, smallholders, and settlements. No such investments were federal. Federal governments did invest substantially in scientific and technological

development, which involved field data collection by the Brazilian Forest Service (SFB) for building the National Forest Inventory (USD 31.7 million).

Universities, by contrast, invested the most financial resources in scientific research (USD 4.7 million) and development of the research infrastructure (USD 3.9 million). For instance, one project from the Federal University of Pará conducted research for the development of new products from bioactive compounds of plants typical of the Amazon Biome (USD 0.7 million), and invested in the development of new forest products, such as herbal medicines, cosmetics, and food products, among others. Natura, a private cosmetics company from Brazil, announced in 2016 an investment of more than USD 70 million in biodiversity inputs as part of its Amazon Program that aims to develop a new line of products with origins in Amazon Biodiversity.

5. Amazon Fund Design Choices and Effectiveness

The findings of our analysis of the recipient projects in the Brazilian Amazon Fund reflect a broad variety of stakeholders and activities. Following the categorization of Luttrell, Loft, Fernanda Gebara, Kweka, Brockhaus, Angelsen, and Sunderlin [27], the recipient projects of the financial resources from the Amazon Fund often involve the largely indirect contributions of effective facilitators, legal rights holders, cost-incurring groups, forest stewards, or poor communities. Moreover, the Amazon Fund's financial resources were channeled towards the direct and structural drivers of deforestation, but this distribution was not proportional to the importance of addressing these drivers, as argued by some scholars (e.g., [32]). Investment patterns tend to reflect specific relations between specific stakeholder groups and project activities. Although activities also vary considerably, there are some general patterns. Federal government organizations tend to invest in development of monitoring systems (45.7%) and inventory data (22.6%), which reflects a main concern with gaining control over deforestation dynamics. State government organizations tend to invest mostly in CAR implementation (40.1%) and capacity-building for state and municipal organizations (20.3%), thereby incurring many of the costs of federal policies. Finally, investments by NGOs have mainly benefited local communities who aim to adopt sustainable production activities (64.2%), but NGOs have also supported (more than federal or state government organizations) land tenure regularization projects (19.3%).

The geographical distribution of financial resources seemed to follow a more focused rationale. We found that many project organizations were located in municipalities with the highest consolidated deforestation rater of Brazil. For instance, NGO projects for territorial and ecological zoning, strengthening of PA and IT management, as well sustainable production, represent 30% of the total disbursements from the Amazon Fund and were largely located in this region. Disbursements from the Amazon Fund to the three main recipient categories have generally benefited municipalities located in areas where deforestation threats are highest [53]. This observation only partially corresponds with the findings by Wolosin, Breitfeller, and Schaap [10], as we found no evidence of substantial contributions to areas with high tree cover, which are more commonly found in remote areas of the Amazon biome [35].

Within the pre-established main-components of the Amazon Fund, we also found variation in the activities that compose these categories. For instance, while most financial resources were channeled to the strengthening of monitoring and control activities by federal and state governments (USD 287.2 million), their investments have focused on monitoring activities like satellite imaging (USD 70.6 million) and CAR implementation (USD 102.5 million). This result contrasts with the substantially smaller investments in control activities like combating forest fires (USD 32.5 million) or law enforcement (USD 29.6 million). This trend is representative of the broader resource allocation within the monitoring and control category. Similarly, investments in land regularization were mainly directed at indigenous territories and protected areas (USD 66.0 million), whereas smallholders (USD 4.3 million) received much less support.

Based on our findings on the variations in financial resource distribution, we argue that the project owners impose a substantial influence on the nature of activities that forest conservation funding

ultimately supports. The current approach adopted by the fund incentivize project submissions in activities and geographies where they may be most successful in reducing deforestation had a limited effect. Corresponding with the study by Weatherley-Singh and Gupta [32], for example, the Amazon Fund restricts financial resource allocation to the four main-components of its theory of change, while not addressing alternative factors, such as the impacts of cattle ranching, road construction, international demand for agricultural products, or corruption. However, any project proposal that adheres to the project quality criteria and guidelines of the Amazon Fund [13] may become eligible for financial support. In other words, the Amazon Fund takes a more passive stance towards resource allocation after the criteria and guidelines are in place. This view accounts for the great variety of stakeholders, activities, and geographies, as described above, since each stakeholder category seems to prefer a different investment strategy. Such behavior may ultimately undermine the effectiveness of conservation funding provided by Norwegian and German donor organizations, at least in terms of emissions reductions.

As already argued in Section 2, the Amazon Fund´s theory of change is generally geared towards deforestation reduction, but the design choices of individual projects are primarily directed at contributing to one or more main components. The evaluation of a completed project in northern Mato Grosso [46], for instance, indicates that the project geared its intervention logic upon its contribution to the main-components "sustainable development" and "monitoring and control", and stated that the main contribution to emissions reductions came from "the restoration of native vegetation and pastures and the planting of native species in permanent protection areas". The extent to which such projects achieved emissions reductions was not stated in the report and would admittedly be a complex methodological endeavor. The leeway that projects have in contributing to these main-components, although important for attracting project proposals, accounts (at least partially) for the imbalanced allocation of financial resources discussed above and may, to some extent, undermine the Amazon Fund's contribution to deforestation reduction.

It is important to note that this undermining of the Amazon Fund´s overall contribution is by no means intentional. At the same time, there are also indications that some projects require a more in-depth evaluation and a longitudinal approach in order to observe their outcomes come to fruition. Particularly but not exclusively, projects from governmental organizations are under greater pressure from critical considerations of their contribution to emissions reductions. One may argue that investments in CAR implementation, for example, support more structural improvements of a nation-wide instrument to enhance monitoring capacity, but some studies point out that it is still unclear whether and to what extent this instrument, indeed, contributes to reducing deforestation [48,54]. In addition, our analysis indicates that federal government organizations (i.e., CENSIPAM, INPE and IBAMA) tend to lack financial additionality. Particularly, the substitutive nature of the Amazon Fund financial resources of IBAMA projects is worrying, because these investments often involve more direct contributions to reducing deforestation, most notably the enhancement of (the capacity for) environmental inspections and fire combat. While the lack of funding for law enforcement may have led to an even higher spike on deforestation rates, a country with a mature enough environmental governance should be able to grant a stable source of public funding by giving priority to this agenda.

6. Conclusions

Our analysis also helps to understand why empirical studies seem ambiguous about the effectiveness of forest conservation funding. As explained in Section 3, BNDES' approach to distributing financial resources from the Amazon Fund to individual projects occurs based on the evaluation of project proposals based on the funds widely encompassing guidelines rather than a strategic selection of projects based on the need to reduce deforestation in areas under threat. As a consequence, our findings show that disbursements by the Amazon Fund to individual projects adhere to very diverging theories of change within a broader REDD+ and RBF strategy. The contribution of each individual project for deforestation reduction are complex to be measured and require additional

studies [17,18,22]. Nevertheless, our results suggest that the lack of strategic focus of disbursements may compromise the ability of the fund to obtain further deforestation reductions on the short term.

It is particularly concerning the observation that the resources provided by the Amazon Fund have offset budgetary losses from the Brazilian government in some areas, putting into question the financial additionality of the fund. At the same time, deforestation rates have been on the rise since 2012, the same period during which the fund has started to take place more steadily [19]. It should be emphasized that the fund is not expected to influence deforestation rates for the whole biome, and the lack of additionality in some years can be explained by the economic and fiscal crisis in Brazil. However, these trends taken jointly may weaken the credibility of financial support from the Amazon Fund and other RBF programs on the long term. The sustainable development activities in NGO projects seem to incite less critique, but these projects require much closer scrutiny in order to understand the extent to which they indeed reduce deforestation. Our analysis confirms the argument by Van der Hoff, Rajão, and Leroy [19] that the "demands for demonstrating the results of the Amazon Fund in a scientifically rigorous manner are likely to become an important topic for donor countries".

Alternatively, the Amazon Fund could adopt a more active approach to the allocation of financial resources, for example, by prioritizing a smaller set of activities, with a strong geographical focus. Most importantly, the Amazon Fund should actively identify potential locations and project owners and assist them in constructing high impact proposals. Likewise, the fund should also improve its impact monitoring capabilities and provide incentives to projects that deliver deforestation reductions within the timeframe of the project. This is especially important, as the political climate in Brazil, United States and other countries has become more hostile to environmental interests [52,53,55].

Figure S1: Model for Database Structuration, Figure S2: Steps to collect the variables, Figure S3: Individual Project Page on Amazon Fund website, Figure S4: Database structured at Level I—Projects, Figure S5: Diagram of rules to determine municipalities encompassed by projects, Figure S6: Project Tree, Figure S7: Municipalities weighted by project, Figure S8: Final Database Structure, Figure S9: Pareto graft for NGO's and State projects (USD left bar and % of committed amounts right side, Figure S10: Deforestation in Legal Amazon, PRODES-INPE (2017), Table S1: Municipalities geospatial information sources, Table S2: Municipalities Data Source, Table S3: Variables included in the main-component level, Table S4: Weight calculations per main-component, Table S5: 10 Municipalities with the higher deforestation rates between 2016 to 2017. PRODES-INPE (2017), Table S6: Research assumptions in response at divergences/limitations of data collection.

Author Contributions: Conceptualization, J.C., R.v.d.H. and R.R.; Data curation, J.C.; Formal analysis, R.v.d.H. and R.R.; Investigation, J.C. and R.v.d.H.; Methodology: J.C. and R.R.; Visualization, R.R.; Writing—Review & Editing, J.C., R.v.d.H. and R.R.

Funding: This research was supported by the Universidade Federal de Minas Gerais, through the Pro-Rectory of Research-PRPq/UFMG. Also was financed by CAPES–Brazilian Federal Agency for Support and Evaluation of Graduate Education within the Ministry of Education of Brazil.

Acknowledgments: We thank Alexander Pfaff from Duke University for the inspiration and academic support, and Centro de Inteligência Territorial (CIT), PRPQ/UFMG and CAPES for providing funding for this research.

References

1. Stern, N. *Stern Review of the Economics of Climate Change*; Cambridge University Press: Cambridge, UK, 2006.
2. Angelsen, A. REDD+ as Result-based Aid: General Lessons and Bilateral Agreements of Norway. *Rev. Dev. Econ.* **2017**, *21*, 237–264. [CrossRef]
3. Turnhout, E.; Gupta, A.; Weatherley-Singh, J.; Vijge, M.J.; de Koning, J.; Visseren-Hamakers, I.J.; Herold, M.; Lederer, M. Envisioning REDD+ in a post-Paris era: Between evolving expectations and current practice. *Wiley Interdiscip. Rev. Clim. Chang.* **2016**. [CrossRef]
4. Eichler, R. *Can "Pay-for-Performance" Increase Ultilization by the Poor and Improve the Quality of Health Services? Discussion Paper for the First Meeting of the Working Group on Performance-Based Incentives*; Center for Global Development: Washington, DC, USA, 2006.

5. Eldridge, C.; Palmer, N. Performance-based payment: Some reflections on the discourse, evidence and unanswered questions. *Health Policy Plan.* **2009**, *24*, 160–166. [CrossRef] [PubMed]
6. Van der Hoff, R.; Rajão, R.; Leroy, P.; Boezeman, D. The parallel materialization of REDD+ implementation discourses in Brazil. *For. Policy Econ.* **2015**, *55*, 37–45. [CrossRef]
7. Paul, E. Performance-Based Aid: Why It Will Probably Not Meet Its Promises. *Dev. Policy Rev.* **2015**, *33*, 313–323. [CrossRef]
8. Den Besten, J.W.; Arts, B.; Verkooijen, P. The evolution of REDD+: An analysis of discursive-institutional dynamics. *Environ. Sci. Policy* **2014**, *35*, 40–48. [CrossRef]
9. Carvalho, F.V.d. The Brazilian position on forests and climate change from 1997 to 2012: From veto to proposition. *Rev. Bras. De Política Int.* **2012**, *55*, 144–169. [CrossRef]
10. Wolosin, M.; Breitfeller, J.; Schaap, B. *The Geography of REDD+ Finance: Deforestation, Emissions and the Targeting of Forest Conservation Finance*; Forest Trends: Washington, DC, USA, 2016.
11. Cunha, F.A.F.d.S.; Börner, J.; Wunder, S.; Cosenza, C.A.N.; Lucena, A.F.P. The implementation costs of forest conservation policies in Brazil. *Ecol. Econ.* **2016**, *130*, 209–220. [CrossRef]
12. Boucher, D.; Roquemore, S.; Fitzhugh, E.J.T.C.S. Brazil's success in reducing deforestation. *Trop. Conserv. Sci.* **2013**, *6*, 426–445. [CrossRef]
13. BNDES. *Amazon Fund Activity Report 2017*; BNDES: Rio de Janeiro, Brazil, 2018.
14. Voigt, C.; Ferreira, F. The Warsaw Framework for REDD+: Implications for National Implementation and Access to Results-based Finance. *Carbon Clim. Law Rev.* **2015**, *9*, 113–129.
15. Oxman, A.D.; Fretheim, A. Can paying for results help to achieve the Millennium Development Goals? Overview of the effectiveness of results-based financing. *J. Evid. -Based Med.* **2009**, *2*, 70–83. [CrossRef] [PubMed]
16. Miller, D.C.; Agrawal, A.; Roberts, J.T. Biodiversity, Governance, and the Allocation of International Aid for Conservation. *Conserv. Lett.* **2013**, *6*, 12–20. [CrossRef]
17. Restivo, M.; Shandra, J.M.; Sommer, J.M. The United States Agency for International Development and forest loss: A cross-national analysis of environmental aid. *Soc. Sci. J.* **2018**, *55*, 171–181. [CrossRef]
18. Bare, M.; Kauffman, C.; Miller, D.C. Assessing the impact of international conservation aid on deforestation in sub-Saharan Africa. *Environ. Res. Lett.* **2015**, *10*, 125010. [CrossRef]
19. Van der Hoff, R.; Rajão, R.; Leroy, P. Clashing interpretations of REDD+ "results" in the Amazon Fund. *Clim. Chang.* **2018**. [CrossRef]
20. Birdsall, N.; Savedoff, W.; Seymour, F. The Brazil-Norway Agreement with Performance-Based Payments for Forest Conservation: Successes, Challenges, and Lessons. 2014. Available online: https://www.cgdev.org/publication/ft/brazilnorway-agreement-performance-based-payments-forest-conservation-successes (accessed on 14 March 2019).
21. Dalene, E. *An Assessment of the Brazilian REDD+ Governance System. A Case Study of the Amazon Fund*; Norwegian University of Life Sciences: Ås, Norway, 2011.
22. Hermanrud, K.; de Soysa, I. Lazy thinking, lazy giving? Examining the effects of Norwegian aid on forests in developing countries. *Int. Area Stud. Rev.* **2017**, *20*, 19–41. [CrossRef]
23. Miller, D.C. Explaining Global Patterns of International Aid for Linked Biodiversity Conservation and Development. *World Dev.* **2014**, *59*, 341–359. [CrossRef]
24. Brockhaus, M.; Korhonen-Kurki, K.; Sehring, J.; Di Gregorio, M.; Assembe-Mvondo, S.; Babon, A.; Bekele, M.; Gebara, M.F.; Khatri, D.B.; Kambire, H.; et al. REDD+, transformational change and the promise of performance-based payments: A qualitative comparative analysis. *Clim. Policy* **2017**, *17*, 708–730. [CrossRef]
25. Korhonen-Kurki, K.; Brockhaus, M.; Sehring, J.; Di Gregorio, M.; Assembe-Mvondo, S.; Babon, A.; Bekele, M.; Benn, V.; Gebara, M.F.; Kambire, H.W.; et al. What drives policy change for REDD+? A qualitative comparative analysis of the interplay between institutional and policy arena factors. *Clim. Policy* **2018**. [CrossRef]
26. Wong, G.Y.; Loft, L.; Brockhaus, M.; Yang, A.L.; Pham, T.T.; Assembe-Mvondo, S.; Luttrell, C. An Assessment Framework for Benefit Sharing Mechanisms to Reduce Emissions from Deforestation and Forest Degradation within a Forest Policy Mix. *Environ. Policy Gov.* **2017**, *27*, 436–452. [CrossRef]
27. Luttrell, C.; Loft, L.; Fernanda Gebara, M.; Kweka, D.; Brockhaus, M.; Angelsen, A.; Sunderlin, W.D. Who Should Benefit from REDD+? Rationales and Realities. *Ecol. Soc.* **2013**, *18*. [CrossRef]

28. Pham, T.T.; Brockhaus, M.; Wong, G.Y.; Le, N.D.; Tjajadi, J.S.; Loft, L.; Luttrell, C.; Assembe Mvondo, S. *Approaches to Benefit Sharing: A Preliminary Comparative Analysis of 13 REDD+ Countries*; Center for International Forestry Research (CIFOR): Bogor, Indonesia, 2013.
29. Dunlop, T.; Corbera, E. Incentivizing REDD+: How developing countries are laying the groundwork for benefit-sharing. *Environ. Sci. Policy* **2016**, *63*, 44–54. [CrossRef]
30. Vatn, A.; Vedeld, P.O. National governance structures for REDD+. *Glob. Environ. Chang.* **2013**, *23*, 422–432. [CrossRef]
31. Simonet, G.; Subervie, J.; Ezzine-de-Blas, D.; Cromberg, M.; Duchelle, A.E. Effectiveness of a REDD+ Project in Reducing Deforestation in the Brazilian Amazon. *Am. J. Agric. Econ.* **2018**, *101*, 211–229. [CrossRef]
32. Weatherley-Singh, J.; Gupta, A. Drivers of deforestation and REDD+ benefit-sharing: A meta-analysis of the (missing) link. *Environ. Sci. Policy* **2015**, *54*, 97–105. [CrossRef]
33. Busch, J.; Ferretti-Gallon, K. What Drives Deforestation and What Stops It? A Meta-Analysis. *Rev. Environ. Econ. Policy* **2017**, *11*, 3–23. [CrossRef]
34. Nori, J.; Lescano, J.N.; Illoldi-Rangel, P.; Frutos, N.; Cabrera, M.R.; Leynaud, G.C. The conflict between agricultural expansion and priority conservation areas: Making the right decisions before it is too late. *Biol. Conserv.* **2013**, *159*, 507–513. [CrossRef]
35. Potapov, P.; Hansen, M.C.; Laestadius, L.; Turubanova, S.; Yaroshenko, A.; Thies, C.; Smith, W.; Zhuravleva, I.; Komarova, A.; Minnemeyer, S.; et al. The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013. *Sci. Adv.* **2017**, *3*. [CrossRef]
36. Soares-Filho, B.; Moutinho, P.; Nepstad, D.; Anderson, A.; Rodrigues, H.; Garcia, R.; Dietzsch, L.; Merry, F.; Bowman, M.; Hissa, L.; et al. Role of Brazilian Amazon protected areas in climate change mitigation. *Proc. Natl. Acad. Sci. USA* **2010**, *107*, 10821–10826. [CrossRef] [PubMed]
37. Pfaff, A.; Robalino, J.; Herrera, D.; Sandoval, C. Protected Areas' Impacts on Brazilian Amazon Deforestation: Examining Conservation—Development Interactions to Inform Planning. *PLoS ONE* **2015**, *10*, e0129460. [CrossRef]
38. Tierney, M.J.; Nielson, D.L.; Hawkins, D.G.; Roberts, J.T.; Findley, M.G.; Powers, R.M.; Parks, B.; Wilson, S.E.; Hicks, R.L. More Dollars than Sense: Refining Our Knowledge of Development Finance Using AidData. *World Dev.* **2011**, *39*, 1891–1906. [CrossRef]
39. Van der Eynden, M.; Fliflet, H.; Pharo, P.F.I.; Ragnhildstveit, H.; Tønset, S. Lazy thinking, lazy giving—or lazy research? *Int. Area Stud. Rev.* **2017**, *20*, 360–363. [CrossRef]
40. U.N REDD+ Programme. Available online: https://www.unredd.net/documents/global-programme-191/community-based-redd-2992/16012-cbr-progress-update.html (accessed on 10 February 2019).
41. Cordero Salas, P.; Roe, B.E.; Sohngen, B. Additionality When REDD Contracts Must be Self-Enforcing. *Environ. Resour. Econ.* **2018**, *69*, 195–215. [CrossRef]
42. Chiroleu-Assouline, M.; Poudou, J.-C.; Roussel, S. Designing REDD+ contracts to resolve additionality issues. *Resour. Energy Econ.* **2018**, *51*, 1–17. [CrossRef]
43. Dutschke, M.; Michaelowa, A. Development assistance and the CDM—how to interpret 'financial additionality'. *Environ. Dev. Econ.* **2006**, *11*, 235–246. [CrossRef]
44. Rajão, R.; Marcolino, C. Between Indians and "cowboys": the role of ICT in the management of contradictory self-images and the production of carbon credits in the Brazilian Amazon. *J. Inf. Technol.* **2016**, *31*, 347–357.
45. LTS International. *Real-Time Evaluation of Norway's International Climate and Forest Initiative: Synthesizing Report 2007–2013*; Norwegian Agency For Development Cooperation: Oslo, Norway, 2014.
46. Anache, B.; Toni, F.; Maia, H.T.; Queiroz, J. *Effectiveness Evaluation Report: Amazon's Water Springs Project*; GIZ & BNDES: Rio de Janeiro, Brazil, 2016.
47. BNDES. Public Call for Projects. Available online: http://www.fundoamazonia.gov.br/export/sites/default/pt/.galleries/documentos/chamada-publica/Chamada_RCV_prorrogacao-de-prazo.pdf (accessed on 14 March 2019).
48. Azevedo, A.; Rajão, R.; Costa, M.; Stabile, M.; Alencar, A.; Moutinho, P. Cadastro Ambiental Rural e sua influência na dinâmica do desmatamento na Amazônia Legal. In *Boletim Amazônia em Pauta N. 3*; IPAM: Brasília, Brzail, 2014.
49. Hermansen, E. I will write a letter and change the world: The knowledge base kick-starting Norway's Rainforest Initiative. *Nord. J. Sci. Technol. Stud.* **2015**, *3*, 34–46. [CrossRef]

50. Aamodt, S. The Ability to Influence: A Comparative Analysis of the Role of Advocacy Coalitions in Brazilian Climate Politics. *Rev. Policy Res.* **2018**, *35*, 372–397. [CrossRef]
51. Sauer, S.; França, F.C.d. Código Florestal, função socioambiental da terra e soberania alimentar. *Cad. Crh* **2012**, *25*, 285–307. [CrossRef]
52. Rochedo, P.R.R.; Soares-Filho, B.; Schaeffer, R.; Viola, E.; Szklo, A.; Lucena, A.F.P.; Koberle, A.; Davis, J.L.; Rajão, R.; Rathmann, R. The threat of political bargaining to climate mitigation in Brazil. *Nat. Clim. Chang.* **2018**. [CrossRef]
53. Lovejoy, T.E.; Nobre, C. Amazon Tipping Point. *Sci. Adv.* **2018**, *4*. [CrossRef] [PubMed]
54. Costa, M.A.; Rajão, R.; Stabile, M.C.; Azevedo, A.A.; Correa, J.J.E.S.A. Epidemiologically inspired approaches to land-use policy evaluation: The influence of the Rural Environmental Registry (CAR) on deforestation in the Brazilian Amazon. *Elem. Sci. Anth.* **2018**, *6*. [CrossRef]
55. Fearnside, P.M. Brazilian politics threaten environmental policies. *Science* **2016**, *353*, 746–748. [CrossRef]

9

Competing Tenures: Implications for REDD+ in the Democratic Republic of Congo

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Received: 19 September 2018; Accepted: 18 October 2018; Published: 24 October 2018

Abstract: The capacity of the Democratic Republic of Congo (DRC) forests to sequestrate carbon has attracted interest from the international community to protect forests for carbon storage and alleviate rural poverty by establishing REDD+ (Reduced Emissions from Deforestation and Forest Degradation). Using information gathered from interviews, focus groups, field observations, and policy document analysis, this paper demonstrates that REDD+ is not well adapted to the institutional structures of forest governance in the DRC, including both statutory and customary tenure. The lack of harmonization between these systems has created a situation of competition between state and customary authorities. This has created opportunities for powerful actors to 'shop' between the two systems to attempt to legitimize their expanded use and control over forest resources. As the REDD+ process evolves from the preparation to the implementation phase, competing institutional structures may negatively impact the effectiveness of REDD+, as well as the distribution of costs and benefits. While the newly enacted community forest law provides an opportunity to recognize customary rights to forestland, the lack of functional local government at the district and village levels has prompted REDD+ pilot project organizers to establish new village organizations for REDD+.

Keywords: forest tenure; property rights; authority structures; REDD+; the DRC

1. Introduction

The Democratic Republic of Congo (DRC) hosts some of the world's most carbon-rich and biodiverse forests, covering more than 60% of the national territory with an estimated 17 billion tons of carbon sequestered [1]. The current deforestation rate in the DRC is estimated to be 0.27% per year [2]. This has motivated the international community to develop several incentive-based policies that aim to increase the provision of public goods from the forest (carbon and biodiversity) by explicitly valuing these goods and incentivizing their protection through different means, including under the umbrella of REDD+ (Reduced Emissions from Deforestation and Forest Degradation). The full expression behind the acronym is 'Reducing Emissions from Deforestation and Forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks (REDD+)'. REDD+ is a global climate policy instrument designed to provide financial incentives to tropical forest countries and land owners to reduce carbon emissions from deforestation and forest degradation and protect forest carbon stocks. It is assumed that policies like REDD+ will effectively and efficiently conserve forests as well as improve the livelihoods of forest-dependent communities where poverty tends to be pervasive [3–5]. Whether these goals can be achieved depends greatly on the institutional structures that affect forest practices at the local level.

The implementation of REDD+ requires a clear definition/allocation of property rights as a basis for implementing measures and defining who is entitled to compensation. This is not an easy task in the

DRC, where the forest is governed by a statutory tenure that co-exists with customary tenure. Colonial and post-colonial policies on forest governance have been based on the substitution of customary tenure systems with statutory tenure systems to pursue the creation of a modern economy based on market principles [6–8]. This transformation has resulted in conflicts between state agents and traditional leaders around who controls (and should control) access to the forests and its resources [9,10]. Although policy debates in recent years have swung back towards recognizing, adapting, and formalizing customary forest tenure, institutional pluralism (in this paper, we used the term 'institutional pluralism' instead of 'legal pluralism' to denote the existence of two or more institutional structures in one social space [11]), including the presence of different authorities, has maintained and contributed to a general fluidity of the institutional framework for forest governance [7,12].

This paper aims to assess the importance of both customary and statutory forest tenures, the adaptations they produce among local actors, and implications of these aspects for the implementation of REDD+ in the DRC. The paper responds to the following questions: (1) How does institutional pluralism affect local forest use? (2) What are the effects of this pluralism on the implementation of REDD+? The empirical data for this study come dominantly from two REDD+ pilot project sites in the Equateur province along from an analysis of policy documents. By doing this, the paper provides empirical evidence to the scholarly literature on REDD+ on the complexity surrounding REDD+ implementation in a fragile state with competing tenure systems. This contribution is relevant for policy action given the fact that tenure security is crucial for effective forest stewardship and REDD+ implementation [13,14].

In the following, Section 2 provides the theoretical framework of the paper by drawing on institutional theories of forest governance. Section 3 presents the geographical context and the research methods. Section 4 presents the nature and dynamics of both customary and statutory tenure of forest governance in the Équateur province. Section 5 analyzes adaptations of local actors operating within the institutional structures described in Section 4. Section 6 discusses the findings in relation to the development of REDD+ projects in the DRC. Section 7 summarizes the main findings and recommends future policy actions.

2. Conceptualizing Tenure and Property Rights to Forests

Forest tenure is a social contract, whether defined in customary or statutory terms, that determines who can hold and use the forests for how long and under what conditions [15]. Tenure encompasses property rights, understood as the control over a benefit stream and the ability to call upon the collective to stand behind one's claim to this benefit stream ([16], p. 15). Tenure, therefore, embodies both property rights and the authority structures that enforce and legitimatize claims or control over benefit streams. Customary tenure in this context is typically a set of rules that governs community allocation—access, use, and transfer of forests—as enforced by customary authorities in accordance with the customs and traditions of the community. On the other hand, statutory tenure is a set of rules and regulations enshrined in formalized legislation, decided by a legislature, that determines who can use the forests for how long and under what conditions [17]. While Freudenberger (ibid.) made the distinction that customary tenure depends on unwritten rules, and statutory tenure on written ones, the key point involves differences in authority structure.

Property rights to forests are recognized not as a unitary concept of 'ownership' but as a 'bundle of rights' often involving groups of people with multiple and simultaneous rights and hence, a shared interest in a common resource [18–21]. This bundle of rights may be broken down along a continuum from access, to withdrawal, management, exclusion, and alienation rights [22]. Property rights are also differentiated among a variety of rights holders conceptualized into three categories—states, communities, and individuals [23,24]. The authority that defines the bundle of rights specifying property is crucial to the sense of legitimizing or enforcing these rights in practice. Hence, different strategies for accessing and benefitting from forest resources transcend statutory property rights and may rely on different types of authority [25].

In this paper, we use the environmental governance framework developed by Vatn [26] to conceptualize tenure and property rights to forests in the context of institutional pluralism. These structures of forest governance include actors and institutions (Figure 1). Institutions include rules regarding political decision-making—constitutions, gubernatorial decrees, collective choice rules, or customary laws. These decisions create the second type of institution—i.e., those governing the economic process—like property rights. Such rights comprise three elements: user rights, control rights, and alienation rights. User rights are typically access and withdrawal rights, as defined by Schlager and Ostrom [22]. Control rights, also referred to as second-order rights, determine use rights and include management, exclusion, transaction, and monitoring rights [27].

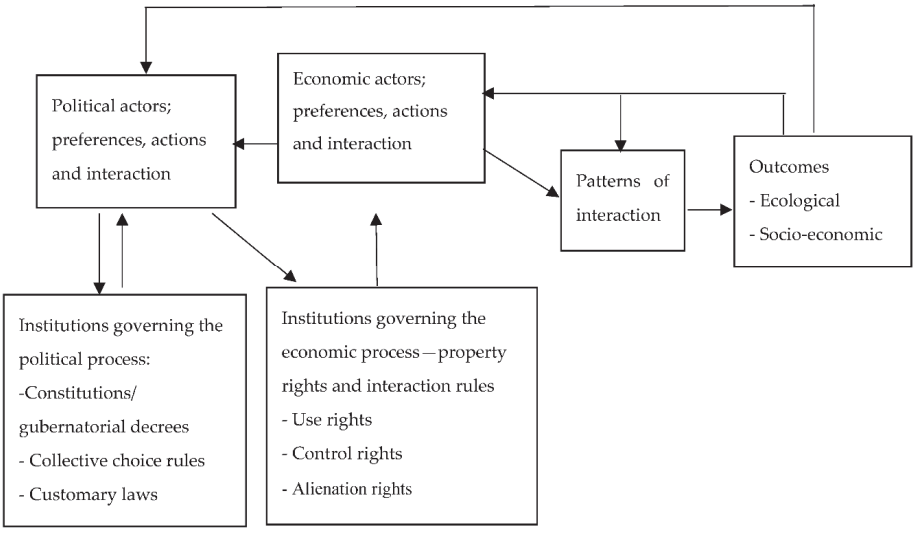

Figure 1. A framework for analyzing forest governance (adapted from [26] 2011, Tapir Academic Press).

Alienation rights are the rights to rent, sell, or transfer rights to others.

Central to our analysis are political and economic actors. Economic actors include local farmers, loggers, and the state as the forest owner that collects revenue through the allocation of timber concessions, but also civil servants when obtaining income from bribes. Political actors include the government, politicians, government agencies involved in forest management, administrators, and traditional authorities who define and enforce the rules of use and the control of forest resources. The political actors are central to our analysis because they have the authority to define and enforce property rights. On the other hand, the economic actors have day-to-day access to the forests and choose which political actors to support and enforce their claims.

In this context, there are two principal types of political actors: state authorities and traditional authorities. The coexistence of the two allows economic actors to choose which authority structure to support their claims. The power of state authorities is enshrined in either the constitution, laws, or gubernatorial decrees, while the power of the traditional authorities is based on customary laws, i.e., rules sanctioned by local customs and traditions that are negotiated and renegotiated over time and space [7,28].

The ways that political actors access their positions are complex in the DRC. State authorities are appointed through elections and political appointments, the latter often based on patron–client relationships [29]. As formal institutions are generally weak, patron–client relationships define who holds political positions. This is true in the forestry sector as well [30,31]. Traditional authorities are appointed through rules based on cultural processes linked to the inheritance of genealogical

rights [32]. Economic actors may interact with political actors through exchange (the state and logging companies or traditional authorities and local loggers) through command (by state and individuals or communities), by granting formal property rights, or by following local/customary rules [26].

To understand how economic actors deal with these overlapping institutional structures that compete for access to forest resources in Équateur province, we employed the institutional bricolage approach developed by Cleaver [33]. It describes the process by which "people consciously and non-consciously draw on existing social formulae to patch or piece together institutions in response to changing situations" ([34], p. 10). Through this process, actors create space to interpret and re-interpret existing institutions, enabling them to interact, negotiate, and compete with each other to access forest resources [33,35]. To create the necessary space to act, actors need to possess certain power resources or mechanisms of access [33]. These power resources are attributes that enable or constrain actors to influence access to forest resources. In forest governance, an economic actor may draw upon different power resources to make claims over forests such as their socio-political position—for example, an official position, formal function, or kinship relations—a social network, economic resources such as wealth, or personal attributes such as knowledge, eloquence, self-confidence, and strength [33].

The environmental governance framework and institutional bricolage framework were selected because they complement each other and provide a better understanding of how institutions and actors operate in practice. While the former focuses on the structural view of power in analyzing institutions, the institutional bricolage approach emphasizes an agent perspective on institutionalized power—how actors operate in relation to institutions.

In the DRC, REDD+ strategies and pilot projects are developed in the context of competing institutional structures for forest governance which are not very different from other Congo Basin countries [36–38]. Consequently, any intervention aimed at promoting sustainable forest management and conservation will have to take into account the existing formal and informal rights over forest resources and the roles of all actors involved. This paper assesses the nature and dynamics of these two conflicting institutional structures of forest governance, how local actors respond to them when legitimatizing use and control rights over forests, and how this might influence the effectiveness of REDD+ on the ground.

3. Geographical Context and Research Methods

The data for this paper were collected from two REDD+ pilot sites in the Équateur province of the DRC (Figure 2). The province was divided into five new provinces in July 2015 following the implementation of the decentralization reform of 2006. The data for this analysis were collected following the political and governance structure of the old province before the division. The province has a total area size of 403,292 km^2, and hosts 28 per cent of the total forest area in the DRC [39]. The population of the province was estimated to be 3,574,385 inhabitants in 2008, distributed into two main ethnic groups—the Bantu and the Batwa—also known as the Pygmies. The Batwa form only about 20 per cent of the total population and are located in the Southern part of the province. The Bantu is divided into different sub-ethnic groups, such as the Bangala, the Ngwaka in the north of the province; and the Mongo, Ntumba, and Ekonda in the south of the province.

The first pilot site was located in Buya 1 village of Bikoro territory, southwest of the old Equateur province, which is now the new Équateur province. This village has an estimated population of about 3000 inhabitants, with about 300 households located just 42 km from Mbandaka, the seat of administration for Équateur province. The main ethnic groups are the Mongo and Batwa Pygmies. The Batwa Pygmies living in the village are not considered customary landowners; they are migrants from the Ingende territory. The village is made up of the clans (A clan is a group of families that share actual or perceived kinship and descent. In the Équateur province and other provinces in the DRC, clans are very important traditional forest management groups)—Ekole, Esangele-Nkoy and Djipanga—and migrants from other districts and territories of the province. Its dominant vegetation is

equatorial swamp rainforest that is inundated year-round, making road construction and maintenance difficult [40].

The second pilot site was located in the Bokumu Mokola village of the Gemena territory, northwest of the old Équateur province, which is now the Sud-Ubangi province. Bokumu-Mokola/Bongo village belongs to the Bominege tribal chiefdom, located about 60 km from Gemena town. The village has an estimated population of 2700 inhabitants, with about 280 households made up of one ethnic group known as Ngwaka. The pilot site is made up of five clans—Boyabakona, Boyagbandolo, Bobanda, Bogbando, and Boyangadaka. Here, the dominant vegetation is dense, humid, equatorial lowland rainforest that transits into evergreen savannah woodland and grasses in the north. The populations of both pilot sites rely heavily on the forest for their livelihoods via slash and burn shifting cultivation, the extraction of non-timber forest products (NTFPs), fishing, hunting, and the production of charcoal.

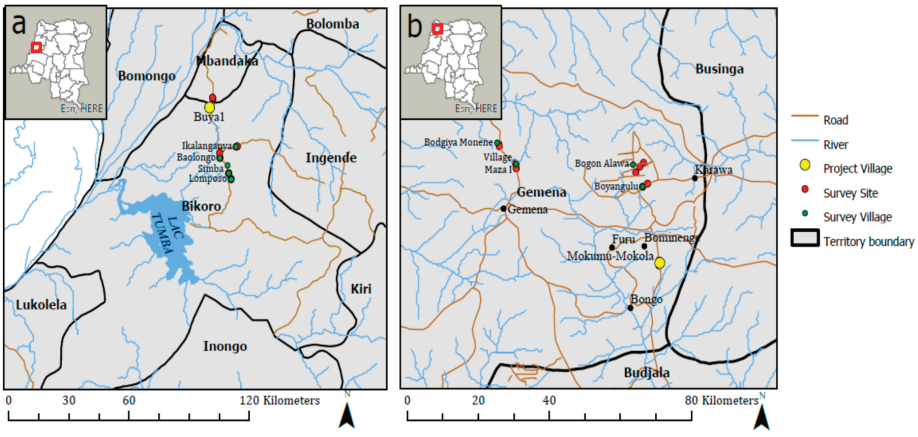

Figure 2. Map of the two pilots in Équateur province: (**a**) Bikoro territory, Buya 1 project village; (**b**) Gemena territory, Bokumu-Mokola project village. Source: Chapman (2016).

Table 1 offers an overview of the statutory and customary authority structures. All villages belong to a particular politico-administrative district unit, which, in turn, belongs to a territory and thence, a province. These politico-administrative units are established by statutory law and were reinforced in the 2006 decentralization reform. This reform demanded the establishment of elected local government structures at the different politico-administrative levels. To date, this has occurred only at the provincial level, with the other units still lacking local government structures. Each of these politico-administrative units, from the village to the territory, is thus still governed by a representative with executive power to implement and enforce state laws and resolve local conflicts. On the other hand, people in the study area also belong to traditional jurisdictions known as tribal chiefdoms, known in in French as groupements. These traditional jurisdictions include the villages and clans and are governed by tribal chiefs. The main function of the customary authorities is to exercise control and manage forestland allocation based on customary rules. The relationship between tribal chiefdom as a customary institution and statutory forestland tenure is analyzed in the next section.

The paper combines data from policy documents, interviews, focus group discussions. and field observations from field research conducted in May–July 2013, July–August 2014, and July–August 2015. National and provincial policy documents and administrative texts were examined, and seventy-two in-depth interviews were conducted in French and Lingala with six different types of actors: customary authorities, local administrative authorities, staff of the different intervening agencies, executive members of the village associations, staff of the REDD+ pilot project, and logging operators. The interviewees were selected from the actor and institution mapping list established during the project's baseline study. They were all contacted and interviewed in person at different times based on

their availability during the field research. The interviews were transcribed and analyzed manually at different stages of the field research process and the corresponding author was the principal researcher who conducted the interviews. Our intention was to gather information on the different institutions that influence forest practices and how actors adapt to these institutions when legitimatizing their rights and access to forests.

Table 1. Characterization of the study area.

Characteristics	Bikoro Pilot Site	Gemena Pilot Site
State authorities	Territorial administrator, district administrator, village administrative chief government agencies, tribal chief	Territorial administrator, district administrator, village administrative chief government agencies, tribal chief
Traditional authorities	Tribal chief, customary chief, notables, and customary landowners	Tribal chief, customary chief, notables, and customary landowners
Dominant ethnic groups	Mongo, Ntumba, Ekonda, Pygmies 20%	Ngakwa
Grass root associations	Peasant development organizations (OPDs)	Religious groups
Intervening agencies	World Food Program (WFP), Food and Agricultural Organization (FAO), Oxfam, Bureau Diocésain du Développement (BDD), World Agroforestry Centre (ICRAF)	Humana People to People Congo (HPP), Communauté Evangélique de l'Ubangi, Mongala, Gemena (CEUM)
Forest use	Conversion of forests for agriculture, logging, charcoal production, non-timber forest products (NTFPs). Presence of logging concessions	Agriculture, logging, charcoal production, NTFPs. Presence of agricultural concessions
Forest type	Dense humid equatorial rainforest accommodating a large portion of swamp forests inundated all year round.	Dense humid lowland rainforest accommodating evergreen savannah woodland and grasses.

To capture local actors' insights on how these institutions shape forest practice, and how they respond to them when legitimatizing their practices, we organized nine focus group discussions with ten members in each group. Five groups in the project village in Bikoro (Buya 1), consisting of, respectively, men, women, customary landowners, migrants, and Pygmies, and another four groups in the project village in Gemena (Bokumu Mokola) consisting of men, women, customary landowners, and migrants were convened. The focus groups considered issues related to local people's rights to resources and benefits and their interactions with local authorities when making decisions about forest rights and conflict resolutions. Field observations were collected on the availability and quality of social infrastructures like roads, schools, healthcare and community activities, rights to land, material resources, places for village meetings, and the way local people engage in these meetings.

4. Forest Tenure Systems at Play in Equateur Province

Here, we examine the nature and dynamics of customary and statutory tenure systems in the Équateur province.

4.1. The Nature and Dynamics of Customary Tenure to Forests

Customary forest tenure is traditionally grouped under a tribal chiefdom (in French: groupement) governed by a tribal chief (in French: chef de groupement). This tribal chief is the highest customary authority in the study area. Each tribal chiefdom is made up of many villages, with the tribal chief being custodian to all forestlands in the chiefdom. The main duties of the tribal chief are to protect the people and the land and to bring fertility to the soil and rivers. Their succession is rotational among the dominant clans of the chiefdoms. Each village that belongs to the tribal chiefdom is governed by a customary village chief. Each village is made up of more than one clan, and the village customary chief is selected from the clan that established the first rights on the village forestland. The customary chief position is based on inheritance among male members of the lineage. Each of the clans are headed by a notable, with acquisition based on inheritance among male members of their lineage. The members of

the clans are considered customary landowners (in French: ayant droits). These different levels are based on their current geographical location, since some clans now extend to other villages within or beyond the tribal chiefdoms.

The customary system of forest management follows a decentralised model where clans of the village constitute the operational units for production and control of the forest, and customary authorities play a role in the supervision and management of disputes. Each tribal chiefdom has a traditional council headed by the tribal chief with the village customary chiefs as representatives. Similarly, each village has a traditional council headed by a village customary chief with the notables as representatives. The latter makes decisions about village land allocations and enforces property rights over the village forests, while the chiefdom's council makes decisions around land allocation. The legitimacy of the customary authority resides in a cultural belief system transferred from generation to generation. There are also traditional mechanisms of sanctioning these authorities if they misbehave.

Rights holders are classified into three categories: collective (customary authorities), clans (group of families), and individuals. User rights belong to members of clans. This group of right holders claim (exclusive) use rights to all forest resources in the territory of the village. Tradition considers customary landowners to be descendants of the male founder of the clan. He established the territorial rights of first occupation through migration and the establishment of a lineage.

Customary landowners perceive the forests to be a common physical and cultural inheritance from the ancestors. These user rights are passed from generation to generation through the genealogical line of the male descendants of the founder of the clan (see [7]). Non-clan members living in the village may be granted user rights to forest resources upon request. Non-clan and complete outsiders may negotiate access and use rights with the customary chief and notables to harvest high-value forest resources such as poles/sticks, timber, and charcoal. Converting forestland into farmland is a decision made among the clans that make up the village. Each member family of the clans receives land for farming. Non-clan members negotiate use rights to farmland with customary landowners either by renting a parcel of land, sharecropping, or other forms of social exchange.

Control rights belong to the customary chief, notables, and clan members. The village customary chief manages and controls access to the villages´ communal land and makes decisions about its allocation. The notables manage and control access to the clans' forestland and allocate land to the family members of the clans for different uses and also resolve internal land conflicts within or between families. Once land has been allocated to the families of a clan, each family establishes productive rights through labor investment. In the Congo Basin, clearing the forest for cultivation and making any labor investment to manage forest resources for productive purposes are the most robust and long-term forms of appropriation associated with exclusive permanent user rights, also known as usufruct rights (see [7,41]). Families that have control rights to forestland may exclude non-family members from using the land for cultivation. However, clan members can still use resources over which the families have not established permanent use rights, e.g., harvesting firewood, gathering non-timber forest products and medicinal plants, and hunting.

According to customary law, it is forbidden for clan members to sell forestland as it is considered the collective property of the clan. Leasehold, renting, or sharecropping of forestland is allowed. The enforcement of customary rules of access and use are based on local norms. These unwritten rules are overlapping, flexible, and subject to negotiation and renegotiation depending on factors such as the persons involved, the place, even the season.

Today, with the increased presence of state agents and local administrative authorities, the authority of the customary chiefs and notables has weakened. This is especially the case in Bikoro. Information from the interviews and focus groups revealed that the enforcement of customary rules to forestland that are not supported by local government representatives is limited. Many wealthy, well-situated, and knowledgeable—i.e., powerful—village members now use local state agents and authorities to establish access to forestland that was once governed by customary tenure. They prefer to report conflicts over land held under customary tenure to local state authorities, like the district

chief or a state agency, like the police, rather than reporting them to the customary chiefs and notables. In doing so, they undermine the authority of the customary leaders.

During the men's focus group discussion in Buya1, a village member noted, 'if you report conflicts over land to the customary chief, the solution is based on our culture and the accused is not well sanctioned' (interview, village member in Buya1 village, 2014). Many participants of the focus groups supported this statement. The presence of local state authorities encourages resourceful village members to circumvent customary authorities by establishing social relations with local state authorities (see [42]).

In the Gemena pilot study, customary tenure to forestland was shown to still be strong and the power of customary authorities over forestland was uncontested. This region is characterized by ethnic homogeneity, and local people tend to reject state institutions because they do not relate to their cultural beliefs, norms, and routinized ways of doing things. The presence of state authorities is also limited due to poor roads and few extractive activities.

4.2. The Nature and Dynamics of Statutory Tenure to Forests

Statutory forest tenure was established in the 2002 Forest Code, which states that all forests are owned by the state (Art. 7, [43]). Article 10 of the Forest Code classifies the forests in three broad categories: classified forests, protected forests, and permanent production forests. The classified forests are designated for environmental protection and may include nature reserves, forests located in national parks, botanical and zoological gardens, hunting areas, urban forests, etc. In protected forests, user rights are less restricted compared to classified forests. The Forest Code also recognizes customary forest tenure in the protected forests, which was reinforced by the 2006 Constitution. Protected forests may also serve as community forests, since they can be granted to communities upon request. In contrast, permanent production forests are designated for the allocation of logging concessions and forests already used for timber production, identified via a public survey process (Art. 23, [43]).

The 2002 Forest Code recognizes the right of communities with customary claims to the forests to use the forests for their subsistence. It also allows communities with customary rights to extract timber from protected forest through artisanal logging permits (Art. 111–112, [43]). Communities may apply for such permits for a maximum of fifty hectares per year on their own or through a private artisanal logger following an agreement between the community and the logger (Arrete 035, [44]). Individuals of Congolese nationality can apply for artisanal logging permits to harvest timber from the protected forest using long saw or a chainsaw [44,45].

The Forest Code and its administrative texts also grant long-term logging rights (control rights) to concessionaires to exploit timber from production forests. The logging rights to concessionaires are granted for a period of twenty-five years through a bidding process that allows both Congolese and non-Congolese nationals to participate (Art. 83, 85–86, [43]). These logging rights mandate the concessionaires to establish a management plan and to consult communities with customary rights to forests that overlap their concessions to negotiate and sign an agreement for socioeconomic development (Art. 89, [43]). The concessionaire must identify these communities and their legitimate authorities through a legally required socioeconomic survey. An administrative text further provides a model for these agreements by, e.g., defining what should be negotiated between the parties (Arrete 028, [46]). However, this text fails to provide guidelines on how to negotiate the social agreement. Hence, in the past, logging compensations were typically granted on a voluntary basis to the customary authorities while excluding the majority of community members [47]. To ensure equity in benefit sharing, a ministerial text known as *Arrêté 023* was adopted in 2010 and provides a new model for the implementation of social agreement (Arrete 023, [48]).

The Forest Code further recognizes community use rights within logging concessions for subsistence but restricts commercial activities and any use deemed incompatible with logging activities (Art. 44, [43]). The Forest Code also allocates control rights to communities through its provision for community forest concessions in protected forests (Art. 22, [43]). The law for the implementation

of community forests was enacted in August 2014. It advances provisions for communities to have concessions of up to 50,000 ha on a perpetual basis, but the guidelines and procedures for implementation are still under process.

The Forest Code grants the Ministry of Environment, Nature Conservation and Tourism (MECNT) the authority to make decisions on forest allocation and management, to issue logging permits to concessionaires, and to approve any forest management plans and the quantity of timber to be harvested. The Forest Code and its implementing regulations, coupled with the decentralization reform, recognized the authority of provincial governors to issue artisanal logging permits in the provinces upon examination of the application and subsequent recommendations made by the provincial and district forest administration. These authorities are mandated to monitor and enforce all the provisions to the Forest Code and its implementing regulations.

In practice, enforcement of the Forest Code and its implementing regulations is very weak. First, the forest classification is not implemented and there is inconsistency in the Forest Code. Second, forest law enforcement is massively under-resourced in the DRC. Enforcement officers represent just 1% of the total staff of the MECNT, and most are based in cities, many miles from the logging concessions they are tasked with monitoring. In addition, very few forest officers have any education beyond secondary school, and access to civil service employment is typically based on political patronage [49,50]. Third, low salaries, which are paid late or irregularly, weaken the quality of their work. Fourth, bribery and corruption at both the national and local levels is a significant barrier to forest law enforcement [51,52]. Fifth, many local authorities and communities know very little about the details of the Forest Code and especially the new institutional structure created by *Arrêté 023*. Finally, conflict between the central and provincial authorities regarding the new division of powers in the management of forest royalties and artisanal operations affects forest law enforcement (see also [12,29,52]).

5. Competing Tenures and Forest Practice in Equateur Province

Here, we describe how the institutional pluralism explained above plays out for two major forest uses—timber extraction and charcoal production—in the study area. We have chosen these two uses as they demonstrate the different ways that local actors adapt to the overlapping institutional structures to legitimatize their forest practices or to make claims on forests.

5.1. Timber Extraction

Artisanal logging permits are granted only to Congolese nationals to exploit timber in protected forests specifically, distinct from the categories of general production or classified forests. Since the classification of the forest estate is not enforced or locally formalized, artisanal logging takes place in uncategorized forests, often including forest concession areas, which thus creates confusion and conflict between concessionaires, artisanal operators, and communities. In an interview with the district MECNT administrator of Gemena territory in July 2015, it was revealed that no artisanal logging permits were issued by the governor for 2014–2015. According to him, many of the artisanal loggers in Gemena operated either with authorization letters issued by MECNT officials in Kinshasa or the territorial administrator or without permits.

Information gathered from interviews with five different artisanal loggers operating in the REDD+ pilot site in Gemena revealed that it is difficult to get artisanal logging permits from the governor or MECNT in Kinshasa, as they do not have the needed 'social capital'—e.g., political connection or social network—to do so. Two of the loggers interviewed operated with receipts issued by the district administration of MECNT. These receipts documented that they had paid taxes to the administration to log timber species and, according to them, this is accepted as if it was a logging permit by both customary authorities and local forest officers controlling timber extraction. The other three loggers interviewed operated without permits. They negotiated their logging rights through customary chiefs and the customary landowners and state administration with informal payments.

These loggers also noted that many artisanal loggers in Gemena operated without permits. They also established social relations with local politicians and military personnel to improve and maintain their negotiation leverage.

Data from interviews and focus group discussions revealed that all artisanal loggers, both with and without permits (tax receipts), had to negotiate their access and use rights to the forest through the customary authority and landowners prior to logging. The negotiation process varied and depended upon the area of forest to be logged and/or the size of the tree's species. The loggers negotiated access rights with the customary authority by providing gifts (alcohol, food, tools, and building materials), including 300–500 USD. If the forest area to be logged had already been allocated to any clan of the village according to customary arrangements, the loggers had to negotiate use rights to the forest with the members of that clan as well by providing payments and gifts. The logger was entitled to the timber species, but the ownership of the forestland remained with the clan (men and customary owners' focus groups at both pilot sites in 2015).

At the Bikoro REDD+ pilot site, three different types of artisanal loggers were identified. One group had logging permits issued by either the governor of the province or top officials at the MECNT in Kinshasa. This group of loggers was considered powerful because they had the material resources, knowledge, and social networks to obtain such logging permits. A group of less well-situated loggers used tax receipts issued from the provincial and district administration of MECNT to establish rights. Those with the weakest relations operated without permits but built social relations with customary authorities and negotiated their way through the administration, either with side payments or by using their social capital, i.e., political loyalty, local networks, and family ties. At the local level (the village), all loggers negotiated their access to the forest with customary authorities and customary landowners. Once the resourceful loggers had negotiated access rights with the customary authorities, they were often reluctant to negotiate their use rights to forests with the customary landowners.

A typical example of this occurred in Penzelle village in 2011–2013, where a powerful artisanal logger operated in the village together with a Chinese partner. The forest area logged was noted as part of a forest concession allocated to a Lebanese logging company (ITB). This artisanal logger operated in the village using heavy machinery without making any agreement with the customary landowners. The local people were unable to influence the logging operation because they were informed that the logger had strong connections both to the governor of the province and the mayor of Mbandaka municipality. The supervisors of the logging operation (two Chinese men) refused to be interviewed by us and asked us to contact the governor of the province or the mayor of Mbandaka municipality.

5.2. Charcoal Production

The situation of charcoal production differs strongly from logging. Charcoal production has become a lucrative economic activity in the Équateur province due to increased demand from the principal cities, including Kinshasa. Charcoal production is considered an activity under the use rights of communities. The Forest Code and its administrative texts make provisions for circulation permits for producers and transporters of woody forest products including charcoal. The local forestry department is authorized to issue these permits at the area of extraction and requires inspections at production sites. The local forestry department is also responsible for issuing sale permits to charcoal merchants and collecting tax. The 2006 decentralization reform transferred the authority to issue sale permits for fuelwood and charcoal to the Directorate of New and Renewable Energy at the Ministry of Energy. This Directorate is also responsible for collecting taxes from charcoal sold in the markets.

Data from interviews with local MECNT officials in Mbandaka and Bikoro as well as local administrative authorities revealed that charcoal production is largely regulated by customary institutions and authorities despite the Forest Code provision (MECNT district administrator pers comm.). This provision is little known and seldom applied. Charcoal production takes place in shifting cultivation areas of the forest, fallow land, and in primary forests. The producers are mainly customary landowners living in these villages, although there are some migrants who engage in this activity as

well. According to these officials and the customary authorities alike, charcoal production is not a primary livelihood activity among local people.

Data from interviews and focus groups in the Bikoro pilot nevertheless indicated that many households are engaged in charcoal production. The presence of the Lebanese logging company in Bikoro provides cheap transportation for charcoal to Kinshasa on the boats that transport its timber. Also, the road that links Bikoro and Mbandaka has reduced transportation costs (including for charcoal) to the town. Bikoro has also witnessed an influx of charcoal merchants in recent years. Many of them pre-finance the production process, provide material support to local producers, and hire labor from the Pygmy population.

The migrants or the merchants who finance the process of charcoal production negotiate use their rights to forest with the customary authorities and customary landowners by either buying trees or renting parcels of forestland to produce charcoal. Many non-clan members living in these villages use forestland to which they have use rights for cultivation to produce charcoal during forest clearing. Information from focus group discussions in the Buya 1 village revealed that many clan members are now restricting non-clan members' rights to produce charcoal on forestland secured for cultivation because of the increasing value of charcoal in the market. Clan members are now demanding non-clan members who want to produce charcoal to negotiate use rights to cut trees standing on forestland secured for cultivation.

At the Gemena pilot site, few customary landowners are involved in charcoal production because of poor roads. The few charcoal merchants operating in the area rent parcels of forestland or buy trees from the customary landowners, including the customary authority, while others pay customary landowners to produce charcoal for them. At the Gemena pilot site, the customary rules prohibit clan members and non-clan members from cutting trees that bear caterpillars for charcoal production. The customary rules are not as strong in Bikoro, since many customary landowners reported the disappearance of trees bearing caterpillars due to logging and charcoal production.

All charcoal merchants are required to have a sale permit, but many operate without them. Many sale taxes are imposed on these merchants by government officials at the markets, at road blocks, and at exit locations. Many transporters and merchants, however, do not pay these taxes but negotiate with government officials at road blocks and exit locations with side payments. Data collected from the interviews and field observations revealed five different government officials that collect taxes from the sale of charcoal. This includes officials from the provincial Ministry of Environment, Ministry of Energy, local territorial and district state authorities, and police department authorities. These different authorities impose different taxes on charcoal transporters and merchants. Similar findings have also been reported in other regions of the DRC [53,54].

In Bikoro, officials of the local MECNT coordination unit collect a sales tax for each bag (about 60 kg) of charcoal to be transported to Kinshasa on the boat of a logging company. Many local producers avoid paying this sales tax by selling their products to charcoal merchants that come to villages. Local producers who transport charcoal to the markets in Mbandaka, however, pay tax. Many of them also complained about taxes imposed on them at the market by various local officials.

6. Institutional Pluralism: What Are the Implications for REDD+?

The above demonstrates the competing relations between the customary and state authorities in legitimatizing and enforcing forest property rights at the local level, especially around timber extraction. Given such an institutional landscape, actors engaged in forestry invent different ways of dealing with the plurality of power centers at the local level to ensure claims to forest resources—a phenomenon known as forum shopping [18]. Their ability to choose which authority structure to legitimatize their forest use depends, however, on the power resources they possess, i.e., material resources, knowledge, and social relations. In such an institutional landscape, there are no effective checks on the powers of the elite relative to the poor and marginalized; actors with more power resources influence those who govern (see [42]).

How then can REDD+ be implemented in an institutional landscape with competing authority structures? Power and authority are very important regarding access to resources, as they largely determine who can benefit from resources regardless of whether they have tenure rights or not [55]. Many scholars have pointed out the importance of forest tenure for REDD+ implementation, since REDD+ is set up to reward those who maintain or enhance carbon sequestration in the forest [14,56,57]. As REDD+ is a payment-based mechanism, rights holders to forest carbon should be the ones who are both compensated and held accountable for fulfilling or failing to fulfill their obligations.

Many civil society organizations operating in the DRC believe that REDD+ affords the opportunity to expedite and enhance the tenure security of forest-dependent communities through reform [58,59]. Others claim that REDD+ interventions might increase state control over forestland while risking the exclusion of some categories of forest users [60,61]. More generally, expediting forest tenure reforms might not guarantee effective and legitimate REDD+ implementation if the authority structures that define and enforce rules are weak and if the process involves top-down government imposition of tenure security through land titling as a prerequisite for the participation of local communities. Through such a process, poor communities are likely to be excluded [62].

Based on our findings, implementing REDD+ in a context of institutional pluralism is challenging, since the current situation has different rights holders using different authority structures to legitimatize their claims to resources. Some scholars have proposed the application for a unitary and fixed institutional structure, enforced by state authorities, as a means for delivering REDD+ outcomes [63,64], but this approach might affect the existing bundles of rights to forests, and thus, the sustainability, of REDD+ generally [65,66]. Such an approach also might fall short in a context where the state lacks the capacity or resources to define and enforce property rights, as seen in this study. State authorities can lose people's confidence when a lack of accountability prevails, when government officials represent private rather than public interests (as seen above), and when appropriate institutional and enforcement protocols can be evaded or corrupted by bribery.

Although our demonstration of the multiple and overlapping institutional structures described above provides a more accurate understanding of forest practices and thus, a greater flexibility for adapting to changes and uncertainty, the lack of harmonization or coordination between those overlapping institutional structures will likely affect the distribution of REDD+ benefits. Customary rules enforced by customary authorities might deliver reasonable outcomes from REDD+ in traditionally homogeneous communities such as Gemena, but are less likely to succeed in areas where there has been significant in-migration such that founding lineages no longer predominate or have lost some authority (see [67,68]).

Customary tenure mirrors the cultural and social values of the community, where the forest is regarded not only as an economic or an environmental asset but also as a social, cultural, and ontological resource that embodies the spirit of the society. The legitimacy of customary authorities largely flows from the community, and their accountability is also based on local norms and customs. In this context, people that share a common background and social history are more likely to trust and respect the customary authorities. Such trust and legitimacy risks decrease if there is perception of corruption and partiality or in situations where customary authorities may not have the knowledge or confidence to deal with pressure from powerful external interests and market penetration. In such circumstances, people may turn to other authority structures (state or international bodies) hoping to get support for their rights claims, even if they fear the loss of autonomy and flexibility that this may entail [69,70]. In addition, customary tenure often favors the rights and benefits of the first occupants, i.e., genealogical and differentiated rights between customary landowners and those considered outsiders. This is more visible when forest resources become more coveted and where the rules of use, exchange, and inheritance become more intricate. In the context of REDD+, non-customary landowners and tenants—including vulnerable groups like the Pygmies and women—may be excluded from REDD+ benefits. This is because women and Pygmies do not have decision-making power and

control over land and forests in the Équateur province [71,72]. This appears to be the case for the distribution of logging compensation in Bikoro territory, as previously documented [42,71].

Since people in our study areas attach considerable trust to customary tenure to secure their rights to forest resources, the formalization of customary tenure in the DRC using the kind of community-based models seen in Tanzania (see [73]) offers a promising opportunity for addressing REDD+ implementation tenure issues in the DRC. Similarly, the DRC's enactment of a community forestry law in August 2014 could further ground attempts to formalize customary rights to forestland [74]. Under this approach, the property rights are perpetually recognized but limited to use and control rights only.

As the modalities and procedures of community forestry in the DRC are under development, early REDD+ pilot projects are applying various mechanisms to recognize customary tenure in their activities [58,59]. They are initiated in the process of introducing REDD+ to these communities using procedures of Free Prior and Informed Consent (FPIC). (FPIC is an important set of principles in the REDD+ social safeguard standard that establishes the rights and conditions for local people's engagement in negotiating the terms of REDD+ interventions that affect their wellbeing and their right to give or withhold their consent to these terms.). While it is typically assumed that local influence on tenure clarification and rights recognition is assured [75], in practice, this process is costly and requires time for proper dissemination of information about REDD+ [57]. In our case study, the REDD+ pilot project organizers conducted the FPIC and started demonstration activities in the communities without yet signing a contractual agreement with the local population. In addition, information about the risks and costs of the project as well as issues related to land rights and forest tenure were not provided or discussed during FPIC. When introducing REDD+, many pilot projects conduct land use planning by engaging the local people through a participatory land use mapping exercise that charts customary use rights. This includes the development of operational rules for resource use and collective choice institutions for management and exclusion.

Because of a lack of harmonization or coordination between the customary and statutory institutional structures of forest governance in the DRC in conjunction with an absence of functional local government at the district and village levels, many REDD+ pilot project organizers—including those in our case study—have facilitated the establishment of a new village organization for REDD+ implementation. This new village organization is called the Local Development Committee, also known in French as Comité Local de Développement (CLD). This new village structure accords with the legal mandate (Law No 08/012 of 31 July 2008 elaborating the decentralization reform in Art 3 of the 2006 constitution) stating that if no local government is in place, a project like REDD+ must establish an CLD. An executive manages this new village organization for REDD+.

While the mechanisms used to create an CLD and executive committee vary among the REDD+ pilot projects, for our case study, household heads sat as members of the CLD and provided the electorate for electing the executive committee. This excluded women from participation, since more than 80% of the household heads in our case study were men—see also Samndong [76]. In the ERA REDD+ project in Mai-Ndombe, all the members of the village general assembly are considered members of the CLD, and members of the executive committee were elected from the village general assembly [77]. As a mechanism for harmonizing and coordinating this new REDD+ organizational structure with customary institutions in order to build local trust and legitimacy, the president of the CLD in Bikoro is the village customary chief, while the president of the CLD in Gemena is one of the customary landowners. This is also the case for the ERA REDD+ project in Mai-Ndombe, where all of the presidents of the CLD in every village are customary landowners.

While it is still too early to assess the effectiveness of the new village structure for the delivery of REDD+ outcomes, the representativeness and accountability relations of the authority structure in this REDD+ village organization will depend greatly on the social processes and local power dynamics influencing the distribution of REDD+ benefits. This structure is different from the existing structure as it is established through a democratic (if not complete) process, while the existing structure is based

on local norms and customs. This recognition of the customary chief and customary landowners in allowing them to head the executive committees of these REDD+ organizations might prompt and empower the customary institutions to be more democratically accountable, thus transforming local norms and customs and minimizing the effects of the current pluralist situation. However, if these authorities are not accountable to the local people, it may simply reinforce elite interests and the exclusion of some segments of the population.

While clarifying property rights to forests might be a pre-condition for enabling benefits from REDD+ to occur, the success of these rights is conditional upon the level of ethnic heterogeneity. In the case of the Bikoro pilot site with its high ethnic heterogeneity, such a measure might favor the dominant ethnic group and hence, additional measures could be needed to secure benefits to other ethnic groups. In situations where these rights are weakly enforced, some people might apply different strategies to access and benefit from REDD+ depending on their relationships with the authority structures and their ability to influence decisions.

7. Conclusions

This paper documents that the forest in the Équateur province is governed by both statuary and customary tenures. The statuary tenure was introduced by colonial and postcolonial authorities to override customary tenure and enforce state control over forestland and thus, generated a situation of institutional pluralism. While customary tenure is flexible and subject to negotiation, statuary tenure is based on legislation with less flexibility and room for negotiation. The lack of harmonization and coordination between these two tenure systems has created a situation where the state and customary authorities compete to legitimize forest practice at the local level. This has created room for local actors who move across these institutional landscapes to patronize authorities who favor their particular use of forest resources. In this way, empowered local actors (local powerful people—mainly logging operators with permits) can draw on state authorities to support claims to forests or legitimize their use rights, while less empowered local actors instead build relationships with traditional authorities to secure their access and use rights to forests. The situation is exacerbated further by the inconsistency of the statuary tenure and its weak enforcement. As such, local state authorities can reshape statuary tenure provisions before they arrive at the local level as a way of favoring their personal interests. Although such an institutional landscape provides greater flexibility for adapting to changes and uncertainty, any implementation of REDD+ benefits under these institutional conditions will greatly affect their distribution.

For REDD+ to be effective and legitimate at the local level, there is a need to address tenure insecurity and the basis of conflicts over forest access and use. The competing forest tenure systems in the DRC imply that a 'one size fits all' approach to REDD+ is doomed. While recognizing customary tenure seems a better approach for addressing tenure in REDD+ implementation, such an approach first requires land tenure reform. Early actions towards addressing tenure in REDD+ through the establishment of collective choice institutions and land use planning may seem more demanding than a top-down approach, but the former affords a better chance of delivering effective and legitimate REDD+ outcomes at the local level. At the same time, however, the authority structure(s) that undergird collective choice institutions to define and enforce REDD+ rules and benefit distribution locally must also be empowered to be more democratic and accountable in order to avoid elite capture and to ensure legitimate outcomes for REDD+.

Author Contributions: R.A.S.: Conceptualization, developed research instruments, data collection, analyzed data, writing and rewriting. A.V.: project proposal for funding, assist in conceptualization, reviewed and commented in research instruments, assist in writing, editing and rewriting.

Funding: This research was funded by [Norwegian Research Council] grant number [4403040214].

Acknowledgments: This research was supported by the Norwegian Research Council through the Man and Forest Research Project 2014–2016. The authors would like to thank all those who participated in the interview survey. We thank two anonymous reviewers for their constructive comments in the early versions of the manuscript. We are grateful to Millie Chapman for producing the maps to our specifications.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Laporte, N.; Merry, F.; Baccini, A.; Goetz, S.; Stabach, J.; Bowman, M. *Reducing CO_2 Emissions from Deforestation and Degradation in the Democratic Republic of Congo: A First Look*; Woods Hole Research Center: Falmouth, MA, USA, 2007.
2. GDRC. *National REDD+ Framework Strategy of the Democratic Republic of the Congo*; Minsitry of Environment Conservation of Nature and Tourism, Ed.; Democratic Republic of Congo UNREDD Programme: Kinshasa, Democratic Republic of the Congo, 2012.
3. Marfo, E.; Acheampong, E.; Opuni-Frimpong, E. Fractured tenure, unaccountable authority, and benefit capture: Constraints to improving community benefits under climate change mitigation schemes in Ghana. *Conserv. Soc.* **2012**, *10*, 161–172. [CrossRef]
4. Angelsen, A. *Moving ahead with REDD: Issues, Options and Implications*; Cifor: Bogor, Indonesia, 2008.
5. Vatn, A.; Vedeld, P.; Petursson, J.; Stenslie, E. *The REDD Direction—The Potential for Reduced Forest Carbon Emissions, Biodiversity Protection and Enhanced Development: A Desk Study with Special Focus on Tanzania and Uganda*; Norwegian University of Life Sciences Noragric: Ås, Norway, 2009; pp. 1502–8127.
6. Mamdani, M. Preliminary thoughts on the Congo crisis. *Soc. Text* **1999**, *17*, 53–62.
7. Diaw, M.C. Modern economic theory and the challenge of embedded tenure institutions: African attempts to reform local forest policies. In *Institutions, Sustainability, and Natural Resources*; Springer: Berlin, Germany, 2005; pp. 43–81.
8. Unruh, J.D. Carbon sequestration in Africa: The land tenure problem. *Glob. Environ. Chang.* **2008**, *18*, 700–707. [CrossRef]
9. Bruce, J.W. *Country Profiles of Land Tenure: Africa, 1996*; Land Tenure Center, University of Wisconsin-Madison: Madison, WI, USA, 1998; Volume 130.
10. Huggins, C. Land, power and identity. Roots of violent conflict in Eastern DRC. *Int. Alert* **2010**, 1–52.
11. Griffiths, J. What is legal pluralism? *J. Leg. Plur. Unoff. Law* **1986**, *18*, 1–55. [CrossRef]
12. Oyono, P.R.; Nzuzi, F.L. Au Sortir d'une Longue «Nuit» Institutionnelle», Perspectives de Gestion Décentralisée des Forêts et des Bénéfices en RD Congo Post-Conflit. *Afr. Dév.* **2006**, *31*, 185–216.
13. Cotula, L.; Mayers, J. *Tenure in REDD: Start-Point or Afterthought?* IIED: London, UK, 2009.
14. Larson, A.M.; Brockhaus, M.; Sunderlin, W.D.; Duchelle, A.; Babon, A.; Dokken, T.; Pham, T.T.; Resosudarmo, I.; Selaya, G.; Awono, A. Land tenure and REDD+: The good, the bad and the ugly. *Glob. Environ. Chang.* **2013**, *23*, 678–689. [CrossRef]
15. Sunderlin, W.; Larson, A.M.; Cronkleton, P. Forest tenure rights and REDD+: From inertia to policy solutions. In *Realising REDD+: National Strategy and Policy Options*; Angelsen, A., Ed.; Center for International Forestry Research: Bogor, Indonesia, 2009; pp. 139–150.
16. Bromley, D.W. *Environment and Economy: Property Rights and Public Policy*; Basil Blackwell Ltd.: Cambridge, MA, USA; Oxford, UK, 1991.
17. Freudenberger, M.S. *The Future of Customary Tenure*; USAID: Washington, DC, USA, 2011; p. 18.
18. Meinzen-Dick, R.; Pradhan, R. *Legal Pluralism and Dynamic Property Rights. CGIAR Systemwide Program on Collective Action and Property Rights*; Working Paper; International Food Policy Research Institute: Washington, DC, USA, 2002.
19. German, L.; Mandondo, A.; Paumgarten, F.; Mwitwa, J. Shifting rights, property and authority in the forest frontier: 'Stakes' for local land users and citizens. *J. Peasant Stud.* **2014**, *41*, 51–78. [CrossRef]
20. Galik, C.S.; Jagger, P. Bundles, duties, and rights: A revised framework for analysis of natural resource property rights regimes. *Land Econ.* **2015**, *91*, 76–90. [CrossRef]
21. Barry, D.; Larson, A.M.; Colfer, C.J.P. Forest tenure reform: An orphan with many uncles. In *Forests for People: Community Rights and Forest Tenure Reform*; Larson, A.M., Barry, D., Dahal, G.R., Colfer, C.J.P., Eds.; Earthscan: London, UK, 2010; pp. 19–42.

22. Schlager, E.; Ostrom, E. Property-rights regimes and natural resources: A conceptual analysis. *Land Econ.* **1992**, *68*, 249–262. [CrossRef]
23. Barry, D.; Meinzen-Dick, R. The invisible map: Community tenure rights. In Proceedings of 12th Conference of the International Association for the Study of the Commons, Cheltenham, UK, 14–18 July 2008.
24. Larson, A.M.; Cronkleton, P.; Barry, D.; Pacheco, P. *Tenure Rights and Beyond: Community access to Forest Resources in Latin America*; Center for International Forestry Research (CIFOR): Bogor, Indonesia, 2008.
25. Sikor, T.; Lund, C. Access and property: A question of power and authority. *Dev. Chang.* **2009**, *40*, 1–22. [CrossRef]
26. Vatn, A. Environmental governance—A conceptualization. In *The Political Economy of Environment and Development in a Globalised World—Exploring the Frontiers*; Vedeld, P., Kjosavik, D.J., Eds.; Tapir Academic Press: Trondheim, Norway, 2011.
27. Sikor, T. Property rights and natural resource governance: Extending the conceptual analysis in times of REDD+. In Proceedings of the International conference on Carbon-Land and Property, Copenhagen, Denmark, 1–4 July 2014.
28. Agbosu, L.K. *Land Law in Ghana: Contradiction between Anglo-American and Customary Conceptions of Tenure and Practices*; Land Tenure Center, University of Wisconsin-Madison: Madison, WI, USA, 2000.
29. Trefon, T. *Congo Masquerade: The Political Culture of Aid Inefficiency and Reform Failure*; Zed Books: London, UK, 2011.
30. Trefon, T. *Forest Governance in Congo: Corruption Rules*; U4 Brief; Chr. Michelsen Institute: Bergen, Norway, 2010.
31. Debroux, L.; Topa, G.; Kaimowitz, D.; Karsenty, A.; Hart, T.; Abdon, A.; Amsini, F.; Aveling, C.; Bertrand, A.; Bekhechi, M. *Forests in Post-Conflict Democratic Republic of Congo: Analysis of a Priority Agenda*; Sel. Books; Center for International Forestry Research: Bogor Barat, Indonesia, 2007; pp. 1–107.
32. Diaw, M.C. *Si, Nda Bot and Ayong: Shifting Cultivation, Land Use and Property Rights in Southern Cameroon*; ODI: London, UK, 1997.
33. Cleaver, F. Reinventing institutions: Bricolage and the social embeddedness of natural resource management. *Eur. J. Dev. Res.* **2002**, *14*, 11–30. [CrossRef]
34. Cleaver, F. *Development through Bricolage: Rethinking Institutions for Natural Resource Management*; Routledge: Abingdon-on-Thames, UK, 2012.
35. de Koning, J. Reshaping Institutions–Bricolage Processes in Smallholder Forestry in the Amazon. Unpublished Ph.D. Thesis, Wageningen University, Wageningen, The Netherlands, 2011.
36. Ingram, V.; Ros-Tonen, M.A.; Dietz, A.J. A fine mess: Bricolaged forest governance in Cameroon. *Int. J. Commons* **2015**, *9*, 24. [CrossRef]
37. Assembe-Mvondo, S.J.A.S. Local communities' and indigenous peoples' rights to forests in Central Africa: From hope to challenges. *Afr. Spectr.* **2013**, *48*, 25–47.
38. Laird, S.A.; Ingram, V.; Awono, A.; Ndoye, O.; Sunderland, T.; Fotabong, E.L.; Nkuinkeu, R. Integrating customary and statutory systems: The struggle to develop a legal and policy framework for NTFPs in Cameroon. In *Wild Product Governance: Finding Policies that Work for Non-Timber Forest Products*; Earthscan: London, UK, 2010; pp. 53–70.
39. UNDP. *Plan Quinquennal de Developpement de la Province de l'Equateur (2010–2014)*; UNDP Office: Mbandaka, Democratic Republic of the Congo, 2009.
40. Yamba, P.K. *Congo Basin-DRC: Case Studyon the Ngiri-Tumba-Maindombe Wetland Landscape*; Institute for Environmental Security: The Hague, The Netherlands, 2009.
41. Graziani, M.; Burnham, P.; Homewood, K. Legal pluralism in the rain forests of South-eastern Cameroon. In *Rural Resources and Local Livelihoods in Africa*; Palgrave Macmillan: New York, NY, USA, 2005; pp. 177–197.
42. Samndong, R.A. Institutional Choice and Fragmented Citizenship in Forestry and Development Interventions in Bikoro Territory of the Democratic Republic of Congo. *Forum Dev. Stud.* **2015**, *2*, 251–279. [CrossRef]
43. GDRC. Forest Code. Law No. 1 1/2002. 29 August 2002.
44. MECNT. Arrêté 035 and Arrêté 105, the Ministerial Orders that lay out procedures for the granting of various logging permits. Arrêté n°035/CAB/MIN/ ECN-EF/2006 du. 05 Octobre 2006.
45. Global-Witness. *The Art of Logging Industrially in the Congo: How Loggers are Abusing Artisanal Permits to Exploit the Democratic Republic of Congo's Forests*; 0957322828; Global Witness: London, UK, 2012.
46. MECNT. Arrête Ministériel No. 028/CAB/MIN/ECN-T/15/JEB/09 of August 20. 2008.

47. Seyler, J.R.; Thomas, D.; Mwanza, N.; Mpoyi, A. *Democratic Republic of Congo: Biodiversity and Tropical Forestry Assessment (118/119)*; USAID/Democratic Republic of the Congo: Washington, DC, USA, 2010.
48. MECNT. Arrête No. 023/CAB/MIN/ECN-T/JEB10 10 du 07 Juin 2010.
49. Lawson, S. *Illegal Logging in the Democratic Republic of the Congo*; Chatham House: London, UK, 2014.
50. Samndong, R.A.; Nhantumbo, I. *Natural Resources Governance in the Democratic Republic of Congo: Breaking Sector Walls for Sustainable Land Use Investments*; IIED: London, UK, 2015.
51. Kodi, M. *Corruption and Governance in the DRC during the Transition Period (2003–2006)*; No. 148; Institute for Security Studies Monographs: Dakar, Senegal, 2008; 114p.
52. Benneker, C. *Forest Governance in DRC: Artisanal Logging, Moving Forward with Forest Governance*; Tropenbos: Wageningen, The Nertherland, 2012; pp. 29–35.
53. Trefon, T.; Hendriks, T.; Kabuyaya, N.; Ngoy, B. *L'économie Politique de la Filière du Charbon de bois à Kinshasa et à Lubumbashi*; University of Antwerp: Antwerp, Belgium, 2010.
54. Schure, J.; Ingram, V.; Arts, B.; Levang, P.; Mvula-Mampasi, E. Institutions and access to woodfuel commerce in the Democratic Republic of Congo. *For. Policy Econ.* **2015**, *50*, 53–61. [CrossRef]
55. Ribot, J.C.; Peluso, N.L. A theory of access. *Rural Sociol.* **2003**, *68*, 153–181. [CrossRef]
56. Resosudarmo, I.A.P.; Atmadja, S.; Ekaputri, A.D.; Intarini, D.Y.; Indriatmoko, Y.; Astri, P. Does tenure security lead to REDD+ project effectiveness? Reflections from five emerging sites in Indonesia. *World Dev.* **2014**, *55*, 68–83. [CrossRef]
57. Sunderlin, W.D.; Larson, A.M.; Duchelle, A.E.; Resosudarmo, I.A.P.; Huynh, T.B.; Awono, A.; Dokken, T. How are REDD+ proponents addressing tenure problems? Evidence from Brazil, Cameroon, Tanzania, Indonesia, and Vietnam. *World Dev.* **2014**, *55*, 37–52. [CrossRef]
58. Aquino, A.; Guay, B. Implementing REDD+ in the Democratic Republic of Congo: An analysis of the emerging national REDD+ governance structure. *For. Policy Econ.* **2013**, *36*, 71–79. [CrossRef]
59. Mpoyi, A.M.; Nyamwoga, F.B.; Kabamba, F.M.; Assembe-Mvondo, S. *The Context of REDD+ in the Democratic Republic of Congo: Drivers, Agents and Institutions*; CIFOR: Bogor, Indonesia, 2013; Volume 94.
60. Fobissie, K.; Alemagi, D.; Minang, P.A. REDD+ Policy Approaches in the Congo Basin: A Comparative Analysis of Cameroon and the Democratic Republic of Congo (DRC). *Forests* **2014**, *5*, 2400–2424. [CrossRef]
61. Phelps, J.; Webb, E.L.; Agrawal, A. Does REDD+ threaten to recentralize forest governance? *Science* **2010**, *328*, 312–313. [CrossRef] [PubMed]
62. Corbera, E.; Estrada, M.; May, P.; Navarro, G.; Pacheco, P. Rights to land, forests and carbon in REDD+: Insights from Mexico, Brazil and Costa Rica. *Forests* **2011**, *2*, 301–342. [CrossRef]
63. Karsenty, A.; Vogel, A.; Castell, F. "Carbon rights", REDD+ and payments for environmental services. *Environ. Sci. Policy* **2014**, *35*, 20–29. [CrossRef]
64. Karsenty, A.; Assembé, S. Land tenure and implementation of REDD+ in Central Africa. *Land Tenure J.* **2011**, 2.
65. Loft, L.; Ravikumar, A.; Gebara, M.F.; Pham, T.T.; Resosudarmo, I.A.P.; Assembe, S.; Tovar, J.G.; Mwangi, E.; Andersson, K. Taking stock of carbon rights in REDD+ candidate countries: Concept meets reality. *Forests* **2015**, *6*, 1031–1060. [CrossRef]
66. Jagger, P. Confusion vs. clarity: Property rights and forest use in Uganda. *For. Policy Econ.* **2014**, *45*, 32–41. [CrossRef]
67. Fitzpatrick, D. 'Best practice' options for the legal recognition of customary tenure. *Dev. Chang.* **2005**, *36*, 449–475. [CrossRef]
68. Meinzen-Dick, R.; Mwangi, E. Cutting the web of interests: Pitfalls of formalizing property rights. *Land Use Policy* **2009**, *26*, 36–43. [CrossRef]
69. Larson, A.; Marfo, E.; Cronkleton, P.; Pulhin, J. Authority relations under new forest tenure arrangements. In *Forests for People: Community Rights and Forest Tenure Reform*; Earthscan: London, UK, 2010.
70. Marfo, E.; Colfer, C.; Kante, B.; Elías, S. From discourse to policy: The practical interface of statutory and customary land and forest rights. In *Forests for People: Community Rights and Forest Tenure Reform*; Larson, A.M., Ed.; Earthscan: London, UK, 2010; pp. 69–92.
71. Samndong, R.A.; Kjosavik, D. Gendered forests: Exploring gender dimensions in forest governance and REDD+ in Équateur Province, Democratic Republic of Congo (DRC). *Ecol. Soc.* **2017**, *22*, 34. [CrossRef]

72. Stiem, L.; Krause, T. Exploring the impact of social norms and perceptions on women's participation in customary forest and land governance in the Democratic Republic of Congo—Implications for REDD+. *Int. For. Rev.* **2016**, *18*, 110–122. [CrossRef]
73. Dokken, T.; Caplow, S.; Angelsen, A.; Sunderlin, W.D. Tenure issues in REDD+ pilot project sites in Tanzania. *Forests* **2014**, *5*, 234–255. [CrossRef]
74. Maindo, A.; Kapa, F. *La Foresterie Communautaire en RDC: Premières Expériences, Défis et Opportunités*; Tropenbos International: Wageningen, The Netherlands, 2014; p. 159.
75. Fobissie, K. *Experiences and Lessons Learned on REDD+ Social and Governance Safeguards in Cameroon*; COMIFAC: Yaounde, Cameroon, 2014; p. 39.
76. Samndong, R.A. *Socio-Economic Baseline Study of REDD+ Pilot Project in Equateur Province*; Unpublished Field Report; Wood Hole Resarch Centre: Mbandaka, Democratic Republic of the Congo, Unpublished work; 2014.
77. Nhantumbo, I.; Samndong, R.A. Inclusive REDD+: Private sector engagement in REDD+ of the Democratic Republic of Congo (DRC),The case of ERA/WWC Mai Ndombe REDD+ project. In *Field Report*; International Institute for Environment and Development (IIED): London, UK, 2016.

10

Spiders in the Web: Understanding the Evolution of REDD+ in Southwest Ghana

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Received: 22 November 2018; Accepted: 17 January 2019; Published: 2 February 2019

Abstract: The implementation of the global programme on Reducing Emissions from Deforestation and Forest Degradation in developing countries, and the role of Conservation, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks (REDD+) is lacks a robust financial mechanism and is widely criticized for producing too little positive impact for climate, nature, and people. In many countries with tropical forests however, a variety of REDD+ projects continue to develop on the ground. This paper fills in some of the gaps in our understanding of the dynamic relation between global policymaking and implementation of REDD+ on the ground. Using the introduction of REDD+ in Southwest Ghana as an example, we apply a practice-based approach to analyze the different roles that local actors and global-local intermediaries played in the introduction of REDD+. Our results show a more balanced picture than polarized debates at the global levels suggest. The logic of practice explains how REDD+ was translated to the local situation. Global actors took a lead but depended on local actors to make REDD+ work. Together, they integrated elements of existing practices that helped REDD+ 'land' locally but also transformed REDD+ globally to resemble such local practices. REDD+ initiatives absorbed elements from established community-based conservation, forest restoration, and sustainable agro-forestry practices. The evolution of REDD+ in Ghana reflects global trends to integrate REDD+ with landscape approaches.

Keywords: REDD+; practice-based approach; global-local nexus; forest and climate policy; Ghana

1. Introduction

Over the last decade, Reducing Emissions from Deforestation and Forest Degradation in developing countries, and the role of Conservation, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks (REDD+) emerged as an international effort to fight tropical deforestation and to mobilize finance for reducing CO_2 emissions based on avoided deforestation and forest degradation. It developed from a daring proposal in 2005 at the 11th Conference of Parties (COP) at the United Nations Framework Convention on Climate Change (UNFCCC) to a key component of the 2015 Paris Agreement. The 2013 Warsaw Framework was particularly important because it provided guidelines on monitoring through remote sensing and ground-based observations. Subsequently, the Paris agreement created the basis for REDD+ countries to attract investments from donor nations and private sector actors through zero-deforestation policies and carbon markets linked to the national climate action plans or Intended Nationally Determined Contributions (INDC) of REDD+ countries [1–5].

REDD+ developed because it was seen to be a legitimate climate mitigation option that involved developing countries in climate mitigation with promises to benefit local communities and biodiversity conservation [6]. Over time, the introduction of REDD+ has resulted in a plethora of REDD+ initiatives. REDD+ has a strong market share in the voluntary carbon space and bilateral and multilateral

programs have pledged billions of USD to REDD+ preparations including 100 million to Ghana [7]. Given this flexibility, REDD+ is considered to take place in a 'global-local nexus' of forest governance [8]. The global-local nexus combines the qualities of multi-level governance—that highlights how policies are connected across global, national, and local levels—with an emphasis on how networks of actors shape policy more horizontally as well [9,10].

The global-local nexus has not received much academic attention yet in forest policy. Selected studies do study how global, national, and local levels together affect forest policy [9–11]. These studies highlight the specific interactions that occur between different levels of governance. In the case of REDD+, such studies often include calls for better inclusion of local actors and coordination across levels [10,11], amongst others. Other studies limit themselves to the interactions between global and domestic levels of governance more specifically [12–14], mostly focusing on the effectiveness of international efforts—including REDD+—to influence forest policies on the ground. However, studies that focus both explicitly on the global-local nexus and on how actors actively move from one level to another are hard to find. The few studies that do so emphasize that interactions amongst governance actors produce specific practices that are highly sensitive to social-ecological context [15–17].

Critics REDD+ argue that projects fail to be sensitive to both global aspirations and local needs. First, the demand for REDD+ projects that produce emission reductions is relatively small. Reasons include the slump in global carbon prices due to the post-2008 economic slowdown and the failure of the Parties to the UNFCCC to agree on a financial architecture for REDD+. Second, REDD+ is viewed by some as a false solution that deflects attention from the need for companies and governments in the industrial world to take a lead in decarbonizing the economy and places too much responsibility on local communities. Third, the inclusiveness and effectiveness of REDD+ on the ground is challenged by critics that fear for the exploitation and further marginalization of local communities in light of inadequate legal frameworks and a lack of transparency and rule of law [18–23]. Finally, Fletcher et al. [24] argue that conservation markets cannot compete with extractive markets and will always need additional support in terms of subsidies and regulation.

Responding to critiques of REDD+, Angelsen et al. and others [18,25] argue that REDD+ serves as a discursive resource that is constantly reproduced—and altered—in practice. Indeed, Turnhout et al. [26] highlight that REDD+ over time has moved from being a carbon-centered, market-based instrument, to include broader climate mitigation and nature conservation strategies that focus on co-benefits and landscape approaches. Den Besten et al. [27] illustrated that this 'evolution' of REDD+ takes place in the global-local nexus where actors and ideas travel across levels: the capacity building and learning activities of local REDD+ piloting and testing informed REDD+ policy development at the global level. This contributed to the prioritization of inclusive and extensive REDD+ preparations and governance development, ahead of possible future carbon finance mechanisms [6,28].

Ghana is a prominent REDD+ country that has witnessed one of the highest deforestation rates in the world [29]. In 2010, 21.7% of land or 4,940,000 hectares was covered by forest [29]. Deforestation is a critical environmental and economic issue and Ghana. Since 1990, the country has lost more than 33.7% of its forests [29], costing the forest sector an estimated USD $500 million [30]. Subsequently, Ghana received a lot of attention from REDD+ donors and programs. At the same time, it is a country where challenges regarding land rights and inclusive governance by some were seen to complicate the implementation of REDD+ [31]. Despite pledges and commitments from REDD+ donors, relatively little of these funds are shown to reach actors at the lower levels of governance [7]. Early REDD+ actions in Ghana have nevertheless contributed to a strong REDD+ commitment as part of the country's INDC in the context of the Paris agreement [32].

In this article, we show that both global-local intermediaries and local actors have played a key role in the evolving meaning and practice of REDD+ in Ghana, often with limited funding on the ground and in areas where the challenges in terms of land and tenure rights were great. To better understand how the global idea of REDD+ was increasingly shaped by local REDD+ initiatives and

practices, this article focuses on the process of REDD+ introduction in Southwest (SW) Ghana between 2007 and 2017. We apply a practice-based approach [15,33] to analyze how actors across governance scales shape the meaning of REDD+ and how key elements of REDD+ were introduced in practice.

2. Materials and Methods

When analyzing global forest policy, many studies have generated useful insights into the roles that global actors—including governments, non-governmental organizations (NGOs), development agencies, and companies—play on higher levels of governance [6,33–36]. These studies discuss how actors may form new and sometimes unexpected alliances in diplomatic processes [37] and subsequently form coalitions that support new forest discourses, including REDD+. At the same time, these studies often fail to explain how local community members exactly respond to new ideas, policies, and programs in their daily activities and how they relate to the actors designing these policies and programs and how individual actors can operate at multiple governance levels.

To flesh out how local levels of forest governance contribute to global policy development, we need to better understand how the agency of actors is shaped in these contexts [15]. Practice-based approaches explore how actors shape their ideas, identities and behaviors in the context of social practices. In particular, they emphasize that reality—and thus also change—emerges from our practical engagement with it [15]. Practices can be broadly defined as routinized behaviors where meaning and action are entwined [33,38]. Actors are situated in these practices. Their ideas, identities, and behavior are shaped as they reproduce the practice of which they are part [39,40]. Practices are therefore not only just 'entities' but also 'performances' [15,33] of which actors are an active part: as they perform practices, they simultaneously change practices over time.

Practices are not restricted to a single place. They emerge in one place and can travel over time and space, including across a global-local nexus. To understand this mobility of practice, Shove et al. [33] identify three key elements that make up a practice: meaning, competences, and materiality. Meaning includes images and ideas that form the emotional, motivational and normative components of practice. Competences include technical knowledge, know-how and skills that people have or need to perform the practice. Materiality includes physical and technological attributes that are part of society, such as machines, cooking stoves, utensils [33]. These elements are thought to give unity to a practice: when their links are strengthened, the practice persists and when their links are broken the practice dies out. Change can mean that the link between two elements (e.g., meaning and competence) persists while the link with a third element (e.g., materiality) is broken. For our analysis, we use the operationalization of the conceptual framework of Shove et al. [33] by Arts et al. [41]. They interpret meaning as ideas and discourses; competences as standards and procedures; and materiality as technologies and resources.

When practices arrive in a certain place, people unpack them and have the agency to fit them to the local situation [33]. When actors do so, they can change elements and combine them in new ways with the elements of other practices. This ability of actors to change practices within specific situations is called 'situated agency' [40]. It means that actors have the freedom to change practices, not so much because they are autonomous agents, but more so because they are part of the practices that they find themselves in [40]. Accordingly, they have a certain freedom and agency to improvise on existing practices. This improvisation is often done by recombining existing elements of practice, also known as institutional 'bricolage': "a process through which people, consciously and un-consciously, assemble or reshape institutional arrangements, drawing on whatever materials and resources are available, regardless of their original purpose" ([42], p4).

We apply the practice-based approach [33,40] and the idea of 'bricolage' [42] to the case of the introduction of REDD+ in SW Ghana. Doing so, we explore how REDD+ 'traveled' to this area as a set of elements of practice. The practice-based approach makes it possible to analyze how actors received, interpreted, and adjusted REDD+ in SW Ghana to their local practice. By dissecting REDD+ into the materiality, competencies and meaning as elements, it was possible to assess how these elements

combined with elements of other, existing practices as part of the local uptake of REDD+. The actors reconfigured elements via their situated agency in existing practices in the unpacking, influencing, and re-aligning of the elements of REDD+. We focused in particular on how groups of actors sought to introduce new elements of practice in existing routines and practices of forest management and community-based conservation.

We collected data on the introduction of REDD+ in the cocoa growing landscape in the High Forest Zone in SW Ghana from 2009 to 2016. (see Figure 1). Ghana has both seen high rates of deforestation [29] and the development of a variety of REDD+ initiatives. Between 2009 and 2016, the first author helped organize several dialogues, multi-stakeholder consultations and knowledge sharing initiatives while working for the International Union for Conservation of Nature National (IUCN) and the IUCN National Committee in the Netherlands (IUCN-NL). This provided context and contacts with various actors with different views and interests in the introduction of REDD+ in Ghana. It also enabled us to observe interactions of actors with different roles, expertise and expectations with regard to the effectiveness and fairness REDD+. The 'web of actors' are described below following the observations of the first author as one of these actors (representing IUCN). A non-authoritative graphic representation is given in Figure 2.

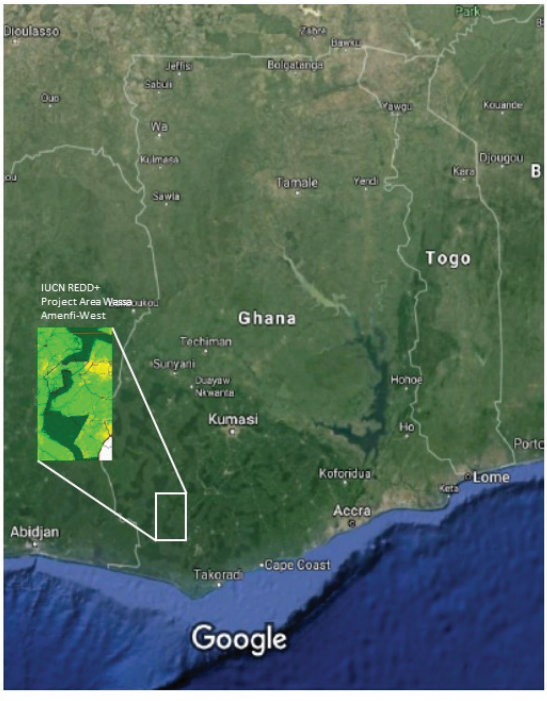

Figure 1. Map with main research area in SW Ghana highlighted.

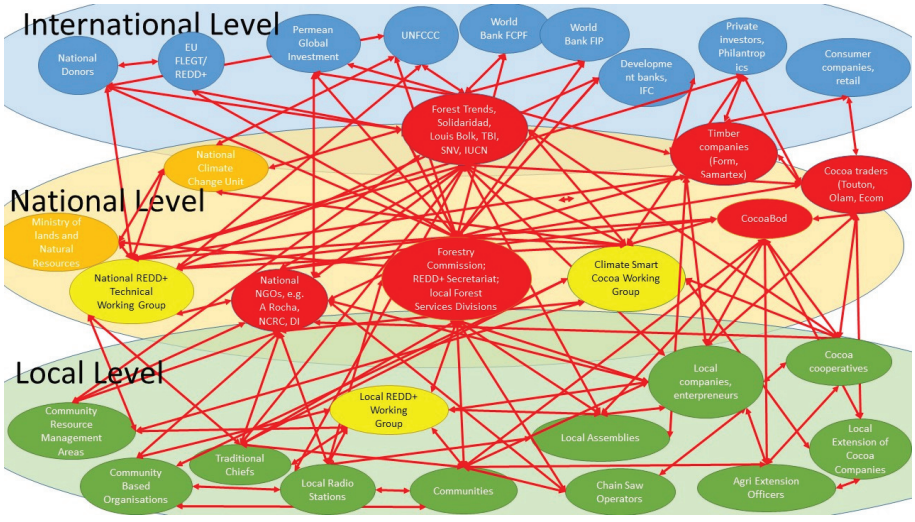

Figure 2. Graphic representation of the relations between various actors of the web of actors of Reducing Emissions from Deforestation and Forest Degradation in developing countries, and the role of Conservation, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks' (REDD+) implementation of SW Ghana as observed by the first author. Actors are color-coded as follows: Red = spiders in the web; Yellow = REDD+ implementation working groups; Blue = global actor; Orange =-national actor; Green = local actor.

To understand the role of global-local intermediaries in Ghana, it was important for the authors to interact with actors working on REDD+ implementation at the national level. In Ghana, the Forestry Commission (FC) of the Ministry of Lands and Natural Resources (MLNR) functions as the focal point for REDD+. The Climate Change Unit functions as the secretariat of the multi-stakeholder REDD + Technical Working Group (NRTWG) that coordinates Ghana's overall REDD+ development process. Government, private sector, civil society and other organizations are represented in this group. The NRTWG gives advice and guidance on all REDD+ processes (FCPF, 2012). Parts of REDD+ are driven by the Natural Resources Advisory Council (ENRAC), the Natural Resources and Environmental Governance Technical Coordination Committee (NREG TCC) that is responsible for the Forest Investment Program and the coordination of the Forest Carbon Partnership Facility (FCPF). Actors in Ghana working with these institutions at the national level, as well as inter-governmental development organizations, conservation and more critical NGOs were interviewed as part of this research. These actors were directly involved in both the international REDD+ engagements and discussions, and the translation of these concepts to the local situation in Ghana. These actors were operating at the global-local nexus, but not in isolation. They worked directly or indirectly with actors at the local levels. Men and women were for example involved in the translation, interpretation and implementation of REDD+ at the local level in the Wassa-Amenfi-West District (WAW). As a case study, we interviewed such actors in WAW and asked them how they viewed, interacted and worked with national and international actors. Locally, members of local settler communities, the District Assembly, traditional authorities, the Forestry Services Division of the Forestry Commission, members of the Community Resource Management Areas (CREMA), companies, local entrepreneurs, representatives of youth and women groups and members of the local multi-stakeholder REDD+ working group were interviewed.

Data collection consisted of three stages. A total of 35 Interviews took place. First, 20 interviews were conducted with local residents of three villages in the WAW where stakeholder consultations on

REDD+ had taken place. These interviews included several group interviews with local smallholder farmers with informal land tenure arrangements. Most of them had been exposed to REDD+ information and awareness raising activities. A few interviewees were local chiefs and two farmers owned larger plots of land. In addition to group and individual interviews in the villages, group interviews were also conducted with one of the CREMAs in WAW and the REDD+ multi-stakeholder platform in the District. The District head and a professional working for the District Assembly were also interviewed. The villages had in the past been involved with various community-based conservation initiatives, such as when Globally Significant Biodiversity Areas were identified. In these initiatives, as well as during the introduction of REDD+, the Forest Services Department of the Forestry Commission of the Government of Ghana played an important liaising role between global NGOs, local communities, and the District Assembly. Second, 15 interviews and various additional informal conversations took place with NGOs, government agencies, and companies that were involved in the introduction or awareness raising REDD+ in SW Ghana. Third, various REDD+ preparatory meetings, dialogues and discussions were observed, and meeting reports studied.

Transcripts of interviews and collected documents and field notes were first coded for categories such as prevailing ideas about forest dependency; indications of actors that presented information and concerns of local actors at the national and global levels; indications of practices and activities that helped local actors in socio-economic development and indications of uptake or change of elements of REDD+ introduced. In a second round of coding, data was analyzed for the three elements of practice, i.e., meaning, competences, and materiality. These initial rounds were then followed by several iterations to structure the results as they are presented below.

3. Results

3.1. The Introduction of REDD+ Practice in SW Ghana

3.1.1. Meaning: Ideas and Discourse

The global meaning of REDD+ is underpinned by the idea that deforestation is a major contributor to climate change because of the CO_2 emissions it causes. Governments, NGOs, Inter-Governmental Organizations (IGOs), companies, and research organizations that helped develop REDD+ at the global level believed that that it was imperative that tropical forests should be protected for climate but also for the biodiversity they harbored and for the local livelihoods they supported [4,5,27]. These ideas are supported by global discourses that assume that addressing deforestation will be an effective, fast, and financially efficient way to help global CO_2 emissions to peak and subsequently fall [43,44].

In Ghana, organizations that were involved in early REDD+ introductory activities included the Nature Conservation Research Center (NCRC), Forest Trends, Rainforest Alliance, Katoomba Group, Conservation Alliance, SNV, Tropenbos Ghana, University of Ghana, World Bank Ghana, Price Waterhouse Coopers (PWC), Permean Global, the Rockefeller Foundation, and Form International. Government agencies such as the Ghana Forestry Commission (FC) that hosted the National REDD+ Secretariat and led the development of Ghana's National REDD+ Strategy played an important role [38,45]. These actors had in common that they worked across the local and global levels of REDD+ development. In particular the non-governmental actors were active in introducing the idea of REDD+ in SW Ghana. Where introductions took place, these organizations generally focused on people and organizations in locations where they were already involved in community-based conservation and sustainable agro-forestry practices.

3.1.2. Materiality: Technology and Resources

Globally, the introduction of REDD+ was closely connected to the emergence and development of remote sensing equipment to monitor forest cover change in ever-greater detail, and information technology (IT) to quantify these changes in terms of loss of carbon to the atmosphere. The emergence

of carbon markets after the Kyoto Protocol that went into effect in 2005 made it possible to credit reduced deforestation and sell the emission reduction permits. Advances in development of use of increasingly complex computer programs also made the presentation of data in maps possible. These made up the materiality of REDD+. The maps of forest cover change and fluxes in carbon stocks became powerful tools to promote the idea and meaning behind REDD+. The combining of these elements clearly strengthened the unity of REDD+ as a practice.

In Ghana, like in many countries, access to forest resources has been unequally distributed. This instilled widespread concern about the access to REDD+ benefits for different groups. REDD+ benefit sharing therefore became a key topic of debate when local actors were engaged in REDD+ preparations. In Ghana, it was mostly official institutions and prominent NGOs that used and adapted remote sensing technology for local biomass monitoring, Carbon stock mapping and the development of national and sub-national MRV systems [46]. Additionally, the economic aspect of REDD+ materiality did not materialize quickly at the local levels. Challenges around land and resource ownership rights and unequal access of communities to forest benefits meant that the translation of Carbon finance into concrete REDD+ projects with benefit sharing was slow. In the meantime, most public REDD+ funds flowed to large, government-led initiatives that deployed relatively few resources piloting and testing [7].

3.1.3. Competences: Standards and Procedures

Global policy development of REDD+ introduced standards and procedures for establishing deforestation rates and baselines for measuring and accounting carbon. New systems for the monitoring, verification, and reporting (MRV) of reduced CO_2 emissions through reduced deforestation, degradation and through forest restoration, made it possible to translate these data into carbon credits. In SW Ghana, competencies to use Geographic Information Systems (GIS), remote sensing, carbon and biomass mapping were mostly introduced and applied by global-local intermediaries such as IUCN, Forest Trends, Katoomba Group and Nature Conservation Research Centre (NCRC) [47]. They worked with the GFC and the Centre for Remote Sensing and Geographic Information Services of the University of Ghana. Local actors were only in some cases involved for on-the-ground verification and to achieve greater accuracy and inclusion [48]. Maps showing trends of deforestation and established baselines were important to prioritize REDD+ action, and to have a reference against which it could be established that REDD+ action would be additional [49]. The mastering of these skills and the resulting calculations and mappings helped organizations in Ghana to promote the argumentation behind REDD+ (meaning) but also made it possible to attract REDD+ finance from international donors. It illustrates that the possibilities for the elements of ideas, materiality, and competences to be linked, contributed to the creation of unity of REDD+ practice.

3.1.4. The Role of Global-Local Intermediary Organziations

The introduction of REDD+ was dominated by organizations that served as intermediary between global and local levels of forest governance. These intermediaries were often NGOs that prioritized the introduction of REDD+ information and ideas to local actors. Technologies, resources, standards, and procedures were however more likely to be overlooked at lower levels of governance. An additional challenge for REDD+ was that REDD+ intermediaries initially did not connect to actors and spaces that represented the larger industrial complex behind deforestation. The dominating idea was that local communities had to be in charge of, and benefit from, REDD+, even when REDD+ introductions were not considered to be truly bottom-up. REDD+ intermediaries had an advantage over local actors because they had access to global ideas and knowledge about REDD+, they took a lead in the disbursement of information, and they dominated the recruitment of participants locally. The following sections will detail how these discrepancies were (partially) addressed while REDD+ evolved.

3.2. The Unpacking and Evolution of REDD+ in Southwest Ghana

In this section, we assess how the 'global-local intermediaries' introduced REDD+ and how REDD+ evolved by integrating elements of existing local practices. The results show how different practices link to and follow up on each other, as well as the role that various actors play in this ongoing process of change. We identified several practices that were empirically linked to REDD+ and to REDD+ working groups by the actors in the field. The most important types of practices thus found were (1) community-based conservation; (2) tree planting; (3) agroforestry and sustainable agriculture; and (4) integrated landscape approaches. Each type of practice is analyzed below.

3.2.1. REDD+ and Community-Based Conservation

Meaning

The ideas behind REDD+ resonated well with local meanings in SW Ghana. A total of 18 out of 20 women and men that we interviewed in WAW confirmed that forests and trees were important for their socio-economic development. Many also believed that forests helped buffer against heat, droughts, floods, and disturbed seasons. The idea that protecting forests contributed to a healthy environmental change resonated well with prevailing, local, holistic views of forests as their social, cultural, spiritual, and physical domain [50]. Most respondents related their personal experiences with climate variability to climate change and believed that they contributed to extreme weather events through their own involvement in tree-cutting. This belief and understanding was probably partly a result of the awareness raising and information activities organized as part of REDD+ preparations and earlier conservation practices but some respondents also referred to information about climate change that they received through the media. Local people seemed perceptive even if they were not in a position to fully assess how their contributions stood in comparison to other global forces driving climate change. A local farmer in WAW for example said:

> "In the dry season the trees preserve water. They give us strength because the trees give us clean air . . . they prevent high temperatures and heavy rains, we need to protect them so we can develop the area well. Streams will (then) never dry up. . . . If we cut the forest, rainfall will reduce so in order to get rainfall and promote agriculture, we need to keep forests intact."

The global meaning of REDD+ was somewhat less compatible with prevailing assumptions among local actors about the role that forests played in their socio-economic development. One of the underpinning ideas of REDD+ social and environmental safeguards is that local communities will prioritize protecting natural forests because they rely on these forests for food, medicinal plants, proteins, medicinal herbs, water, and fuel. Our analysis of local responses to REDD+ however suggests that there is a mismatch between the assumptions behind REDD+ and those of local communities. As we will see in the following sections, they are often inclined to give priority to development opportunities "outside" the forest.

Materiality

REDD+ initiatives in the study period saw little trickling down of forest and carbon monitoring technologies to the lower levels. Additionally, the introduction of REDD+ carbon payments hardly materialized locally while carbon finance from donors and multilateral initiatives mostly flowed to national programs and agencies. Yet, the prospect of possible economic benefits from REDD+ projects created opportunities for people to think about the role that the marked could have in the management of their forest landscapes. It put the spotlight on prevailing local issues of inequality and the experience of people that they had mostly been barred from protected forests. Local interviewees therefore, when asked about opportunities for economic development from forests, often mentioned

options "outside" the forest, such as agriculture, agro-forestry development, and tree-planting. In the words of a professional working for a local conservation NGO:

> "People might rather not have forests because they are disillusioned with the way in which things used to be managed."

The Secretary of a Community Resource Management Area in WAW summed up that REDD+ sounded great but would not be able to materialize for some time due to persisting tenure insecurity and inadequate benefit sharing arrangements:

> "Because of REDD+ we know what we can achieve one day."

The introduction of REDD+ forced actors engaged in community-based conservation to consider the challenges that local communities faced in receiving formal recognition of informal land tenure and ownership arrangements. Statutory and traditional land tenure arrangements in Ghana overlapped and often conflicted. They were virtually nowhere gazetted, and informal tenure arrangements of settler farmers in SW Ghana did not have any formal legal protection at all [13,31]. Even though the introduction of REDD+ benefits did not materialize, the introduction of REDD+ ideas and discourses helped create renewed urgency for the issues of tenure and rights.

Competences

REDD+ introduced competencies to use forest and carbon monitoring technology as well as standards and procedures for establishing deforestation rates and baselines, and for the measuring and accounting of forest carbon. As these technologies were mostly used by national-level agencies, these competencies did not play a direct role in the reconfiguration of REDD+ at the local levels. The focus on equity and the social and legal dynamics of REDD+ however did trigger a demand for an altogether different set of competencies. Standards and procedures had to be developed to ensure social fairness and avoid further exclusion and marginalization of local communities. Here, something interesting happened. The formulation, adoption and prioritization of environmental and social safeguards as part of international REDD+ program and policy development was a direct response to concerns voiced by local actors and their global-local intermediaries [27]. Support for a social and environmental focus was particularly urgent in SW Ghana where formal and traditional legal systems contradicted and where local tenure was considered insufficiently protected by law [13]. The very early REDD+ piloting that global REDD+ had made possible, helped change global REDD+ in such a way, that it created a demand for standards and procedures for the strengthening and safeguarding of social and environmental benefits [27]. In many cases, local actors were already acquainted with these kinds of standards, because they had been developed as part of earlier conservation practices.

The introduction of REDD+ created fresh "demand" for competencies and procedures to ensure social and environmental safeguards, and the deployment of these local competencies contributed to the development of REDD+ in new directions. In SW Ghana for example, existing community-based conservation practices put a lot of emphasis on the importance that forests played in the social, economic, and cultural lives of local people. Participatory research in WAW showed how cash and non-cash use of forest products helped forest-dependent communities to move out of poverty in the long term [51]. REDD+ consultations and interviews with local men and women in the same areas however suggested that socio-economic development could not come from protecting forests alone. Many respondents believed that the future lay in raising standards of agriculture and tree-planting as well as income generation activities "outside" the forest such as tourism and jobs in the city. In the words of local women living near the Globally Significant Biodiversity Area (GSBA) in WAW:

> "We need knowledge for planting crops, for agricultural improvement, production and output of agriculture of our livelihoods for example not to burn our fields, we need the technological know how to improve that."

"I will tell that before we benefited from the forests and now we don't get benefits. So maybe we can get additional support from the government. It is best is for someone to come and teach us techniques to multiply agriculture production."

In short, the outcomes of REDD+ stakeholder consultations in areas where global-local intermediaries had worked on community-based conservation generally pointed at a local need for standards and procedures to redress unequal forest and land access rights, and for competencies to create economic value from the forest areas. The following sections will show how different practices of REDD+ integrated responses to these local demands for particular competencies by building on established practices such as tree planting and sustainable agro-forestry.

3.2.2. REDD+ and Tree Planting Practices

Meaning

Local meanings behind tree planting resonated well with REDD+ meaning. People felt that bringing back trees on deforested and degraded lands were good for themselves and for nature. It also helped them buffer against the impacts of extreme weather. For local people, it was easier to see that they could reap benefits from planting trees than from not cutting naturally growing trees that someone else might cut anyway. In areas where deforestation took place and where individual land rights were not well-defined, it would be difficult to attribute reduced deforestation to individual action and individual people in order to distribute benefits as a reward [52]. The perception was also different because local people could claim rights over planted trees but not over naturally growing trees. Cutting trees was a way for farmers to affirm their right over land tenure and cocoa farmers were afraid to let trees mature in their cocoa farms because licensed loggers were allowed to harvest naturally growing trees, causing damage to crops in the process [28,31]. Reserves or forests nominally owned by traditional authorities were generally treated as common pool resources, resulting in widespread illegal deforestation and forest degradation [31].

Materiality

In Ghana, tree planting could more easily be translated into material gains, because each person that planted and took care of a certain number of trees, would be able to receive incentives or compensation, and could also use other products of the tree. As local farmers said:

"Local people don't want to invest in not using forest for 20 years. If they plant trees such as rubber, they will at least receive income at some point."

A local timber company explained:

"For example, in this REDD+ area, we can give them (local smallholders) incentives to plant trees and then maybe go further, to help them establish small scale saw mills where they process the wood for charcoal, preserve the wood for their daily lives, timber for their domestic use, and then to sell to the local market."

As REDD+ was negotiated at the global levels, many campaign NGOs had criticized this component of the scope of REDD+ out of concern that large scale plantation companies could access REDD+ finance [27]. The above quotes of local actors illustrate that the options for "forest restoration" could indeed be used by plantation companies, but that it also created opportunities to address the needs of local actors. This potential for tree planting and plantation management was strongly represented in early REDD+ proposals and plans in Ghana. The planting of community woodlots for charcoal and fuelwood production, for example, was a main focus area for the REDD+ Readiness Preparation Proposal of the Government of Ghana. The World Bank Forest Investment Program (FIP) and the Government of Ghana also looked into possibilities to support forest restoration and plantation management under REDD+ in Ghana [53]. The FIP was set up to bridge early phases of

REDD+ readiness preparations with future private sector investments [27]. In Ghana, it financed a timber plantation initiative by the Dutch company Form International, a company that had already independently produced Voluntary Carbon Standard (VCS)-certified REDD+ Carbon Credits in their inclusive and sustainable plantation program in Ghana.

Competences

Tree planting practices in Ghana also included important competencies for the clarification of rights that combined well with REDD+. The rights that local people held over planted trees were laid down in the constitution of Ghana [54,55]. In many areas in SW Ghana, local farmers did not know how to assert this right or were not even aware of it, but global-local intermediaries introduced standards and procedures to create awareness and recognition of these rights. Already before REDD+ introductions started earnestly, global-local intermediaries such as IUCN had worked with local actors on the clarification and formalization of this right. They had raised awareness among local bureaucrats and smallholders about existing regulations on the ownership of planted trees, and had developed tree registration procedures with local authorities [56]. The certainty over rights, the prospect of future returns in timber, and possible carbon payments triggered small NGOs and land owners to start small plantations, even though national and local REDD+ monitoring systems were not yet in place. One local farmer in WAW for example was not part of a formal REDD+ project and would alone never be able to produce verified carbon credits. The costs of most certification were so high that it was generally accepted that hundreds of smallholders would have to be aggregated to have the scale needed to carry such investments and generate enough carbon credits to be able to recover upfront investments. He had set up his own mini plantation anyway:

> "I heard a lot on the radio about the money that we could receive for trees. When I decided to have my own little tree plantation early on, many people in my village thought I was crazy, but now that the trees are maturing, they see that I am already reaping benefits, for the community and for my family, regardless of any payments I might receive from carbon or not."

Additionally, larger-scale plantation initiatives and policies included provisions to protect the rights of local people and make the sharing of benefits possible. One such provision was the Modified Taungya System (MTS), a forestry system that involved inter-planting trees with agricultural crops. Respondents regularly suggested that the competences developed under MTS served as an example how benefit sharing could be possible under REDD+.

3.2.3. REDD+, Agro-Forestry, and Sustainable Agriculture Practices

Meaning

As the development of REDD+ progressed in Ghana, its focus gradually shifted to sustainable agroforestry systems and tree planting. Smallholder agro-forestry cocoa production had been a main contributor to the gradual degradation and destruction of biodiversity-rich and high-carbon rainforest in SW Ghana [57]. With a main focus on carbon and avoiding deforestation, the global meaning of REDD+ nevertheless converged well with the meaning of sustainable agro-forestry practices. REDD+ proponents developed programs that focused on increasing per-hectare cocoa yields, improving input management and certified crops. These approaches shared ideas with REDD+ on reducing deforestation, reducing CO2 emissions, and creating outcomes for local communities.

Materiality

Creating economic return from sustainable agro-forestry presented REDD+ with an alternative for carbon finance. The one-million USD 'Climate Cocoa Partnership for REDD+ Preparation' of Rainforest Alliance International and trading company Olam International in the Juabeso-Bia District

in SW Ghana for example made that shift. The project focused on generating increased income from sustainable cocoa production and biodiversity protection through bringing back shade trees and forest protection. A Landscape Management Board consisting of community representatives was set up. The project achieved positive outcomes for communities and biodiversity, but it did not produce verified CO_2 emissions. In the end, the project was not a success because it cost more than the premium sale of sustainable cocoa could deliver. There was also some misunderstanding between the different parties whether REDD+ credits would be generated. The project however showed that the materiality of reducing Carbon emissions and deforestation in (agro-) forestry practices combined well with the idea of REDD+ to address social, environmental and climate objectives simultaneously. This new combination of elements developed also internationally under the term Climate Smart Agriculture (CSA). FAO [58] defines CSA as "an agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes greenhouse gases (mitigation) while enhancing the achievement".

Competences

Sustainable agriculture and agro-forestry practices presented REDD+ with standards and procedures that helped farmers create more return from their fields and competencies to improve their rights. In established sustainable agro-forestry practices, smallholder cocoa farmers were trained in competencies to apply fertilizers and other farm inputs. These meant that these famers could increase their income and have more stable harvests. The planting of trees for shade was also encouraged, and this contributed to the halting of deforestation and the protection of biodiversity. Additionally, it could, if needed, be translated in reduced CO_2 emissions and increased carbon sequestration. Sustainable cocoa agro-forestry presented REDD+ with standards and procedures to achieve social and environmental REDD+ objectives such as increased income, gender inclusiveness, improved input management and soil treatment. It fitted the need for REDD+ to diversify income streams.

3.2.4. Integrated Landscape Approaches to REDD+ in SW Ghana

Meaning

After 2010 and 2013, global-local REDD+ intermediaries in Ghana collaborated to develop landscape approaches to REDD+. These approaches integrated ideas about conservation, inclusive governance, soil and water conservation, sustainable agricultural intensification and the re-planting of shade trees as a means to reduce CO_2 emissions from the landscape and achieve additional social and environmental benefits. In Ghana, a civil society initiative of NGOs, traditional leaders, cocoa trading companies, farmer cooperatives, insurance companies, consultancy firms, certifying agencies and scientists worked with the country's REDD+ Secretariat and Cocoa Board to develop Ghana's 'Emission Reductions Program for the Cocoa Forest Mosaic Landscape' [59,60]. Leading actors in this movement were also actively involved in global trends to integrate elements of REDD+, sustainable agro-forestry, and Climate Smart Agriculture in landscape and jurisdictional approaches [61]. During that time, the landscape approach became a dominant REDD+ discourse globally. It added the idea of territoriality, which according to some actors is problematic because landscape boundaries do not correlate to administrative-political boundaries [12]. The landscape approach nevertheless provided a useful concept that helped in the linking of the elements of materiality and competencies and thus in reproducing REDD+ towards new directions.

Materiality

With the broadening of the scope of REDD+ landscape approaches, the element of carbon monitoring and accounting found new connection with other elements of REDD+ practice. Whereas project-based REDD+ did not "land" due to faltering carbon markets, the scale of large multilateral and donor REDD+ finance arrangements fitted well with landscape and jurisdictional approaches to REDD+. In Ghana, the Cocoa Forest Landscape Mosaic program successfully applied for funding

from the World Bank Carbon Fund. On-the-ground preparations for REDD+ in the cocoa sector were a continuous process where focus gradually shifted from individual projects and carbon finance to creating economic value from climate smart agriculture in a landscape approach. In the words of a professional working on the program:

> "Finally (after years of REDD+ preparations) we sat down with the community and looked at the landscape. And we decided there was no play for REDD+ because carbon finance could not come from reduced deforestation alone. We therefore decided to go for Climate Smart Cocoa."

In 2014, this cocoa landscape program managed to secure the commitment of at least 40 million USD in funding from the World Bank's Carbon Fund to demonstrate REDD+ on a landscape scale [62]. In the next section, we further explain the success of this particular program and the finance it was able to attract.

Competences

The Cocoa Forest Landscape Mosaic program in Ghana was built on a thorough analysis of climate vulnerability in the cocoa sector and the suitability of soils for cocoa production across the landscape. The introduction of procedures for better cocoa planting techniques, farm input use and the planting of shade trees would be crucial to maintain soil productivity and lift farmers out of poverty. Where soils were sub-optimal and climate models were unfavorable, cocoa would have to be taken out of production altogether. However, another set of procedures focused on social inclusion and the clarification of rights: the procedures around the rollout of the Community Resource Management Area (CREMA) model. The CREMA standards and procedures proved a good match with the materiality and meaning of REDD+ landscape approaches.

CREMA became a central component of the development of the Government of Ghana's REDD+ policies and they contributed to the enthusiasm of international donors in the Cocoa Forest Landscape Mosaic program [45,46]. CREMA represented a set of standards and procedures for the devolution of forest resource rights to local communities that had legal backing in Ghana's National Forest and Wildlife Policy [63,64]. NGOs, community groups, and government organizations had years of experience with CREMA as part of community-based conservation and wildlife management [28,65]. In the early 2010s, it became a central element of many REDD+ pilots. In some cases, such as in the Juabeso-Bia project, similar governance structures were designed, modelled on CREMA [66]. For the Cocoa Forest Landscape Mosaic program, CREMA could function as a mini landscape within which the merits of a landscape approach could be combined with the rigor of REDD+ monitoring and verification of reduced deforestation. The interventions and monitoring could subsequently be replicated in new CREMAs and eventually cover the larger landscape. In this way, CREMA was made instrumental in the development of standards and procedures needed to implement REDD+ in a landscape approach.

4. Discussion

The introduction of REDD+ in SW Ghana was not a clear-cut, linear process in which local actors simply implemented global ideas and aspirations. REDD+ was initiated by public, private and non-profit actors that worked across global and local governance scales. They chose sites and got involved in the introduction of REDD+ with local actors with whom they were already involved with in established community-conservation practices. Our practice-based analysis shows how these local actors and global-local intermediaries renegotiated REDD+ and helped shape the evolution of REDD+ at the local, and in return, at the global level. The CREMA model for example, with its procedures for multi-stakeholder collaboration, community consensus building, decision-making, and the formalization of rights, was integrated in various REDD+ initiatives and served to illustrate to international audiences how REDD+ could work at the implementation level [60,63,67].

Applying and refining the framework for studying practices of Shove et al. [33] helped us understand how actors involved in the local introduction of REDD+ combined REDD+ meaning, materiality, and competences with elements of local practices. First, REDD+ ideas about the importance to protect forests resonated well with local ideas and beliefs about the important role that forests played in livelihoods and cultural development of local actors. These ideas prevailed in established practices and, as a result, these practices provided entry points for the introduction of REDD+. Prevailing ideas about the importance of ecologically healthy forests for example helped people realize the assertion of REDD+ that forests also play important roles in reducing the impacts of extreme weather events and climate change. The introduction of REDD+ in Ghana however also exposed divergence between global and local understanding of the role that forests can play in the development of community benefits. Specifically, global ideas on REDD+ underplayed the trade-offs between social and environmental interests in local practice.

The introduction of REDD+ and concerns over social issues created a demand for competences for the organizing of multi-stakeholder engagement, participatory decision-making making, the formalization of rights, and the development of benefit distribution mechanisms. Global negotiations over REDD+ policies and programs started to prioritize social, environmental and governance issues over technical issues of monitoring and this led to the adoption of social and environmental safeguards at COP15 [27]. This shift in thinking at the global level was at least partly a result of early REDD+ introductions and testing at the local levels, such as in SW Ghana [27]. The reshaping of REDD+ on the ground happened in interaction with developments at the global levels, and it was the result of an enactment of REDD+ in the context of established practices in which global-local and local actors were jointly involved. Therefore, as carbon finance moved to the background, established practices such as the creation of economic value tree planting, sustainable agro-forestry, and CSA complemented or replaced this material element of REDD+ practice.

Third, when looking at the material element of REDD+ it transpired that local people welcomed the introduction of carbon finance or other forms of economic value for forests and that monitoring was less relevant in the absence of well-functioning global carbon markets. However, they expressed serious doubts that REDD+ benefits would be effectively and fairly shared among local communities. Their concern was based on past experiences of being denied their rights over natural resources. Neither local nor global-local intermediary actors that were involved in the introduction of REDD+ in SW Ghana considered this the end of REDD+. Instead, at REDD+ introductory and preparatory meetings, people that were involved in the introduction of REDD+ often stressed that REDD+ created opportunities to put concerns over rights and inclusive governance on national and local political agendas.

Our case of in SW Ghana illustrates that global-local intermediaries played an important role in the development of REDD+ pilots. Local community members, local government agencies, and local private sector actors depend on these global-local intermediary actors to provide ideas and information about new technologies, instructions, and skills. Many authors confirm that global policy processes are a source for ideas and discourses [11,12]. What our research shows is that these global processes equally depend on the materiality and competences that form the elements of local practice. The global-local intermediaries that led introductions of REDD+ at the local levels did not only shape the introduction of REDD+ locally, but also influenced the development of REDD+ at the global levels, together with actors involved in the introduction of REDD+ in other countries [27]. As early as 2008, and through 2012, lessons from REDD+ introductions, pilots, and dialogues in SW Ghana reached global REDD+ debates [28,31,68–71]. The mobility of REDD+ to move from the local to the international levels continues to be relevant today, as global negotiations over REDD+ policies and programs are ongoing along with critical debate about the effectiveness and inclusiveness of REDD+ [24,25].

This channeling of ideas, experiences, competences, information and alternatives up and down the global-local nexus make the global-local intermediaries look like “spiders” in a web. They take the lead in initiating REDD+ locally; in choosing sites for REDD+ introduction, and in the recruitment of

local actors. The spiders dominate the process, manage to maintain their place in the web of networks and relations along which elements of REDD+ practices travel from the global to new places such as in SW Ghana. These actors enjoy a position of comparative advantage, having "access" both to local and global ideas, competencies and materialities. Local actors depended on the decisions and resources of these global-local intermediaries, who had comparative advantage over them. Global-local actors in turn also depend on local actors. It was in the joint enactment of established practices with local actors that they could renegotiate and reshape REDD+. By refining the meaning of REDD+ and by absorbing and combining materiality and competences from established practices, global-local actors showed international REDD+ policymakers how REDD+ could work on the ground.

5. Conclusions

Global-local and local actors in SW Ghana continue to develop local interpretations of REDD+ and attract international resources for their initiatives, even while REDD+ is declared "dead" by some [24]. This shows the importance of understanding of REDD+ as part of the global-local nexus of governance [7] By considering the connections between forest governance levels and the key role that both local and local-global actors played, REDD+ is shown to evolve in response to local needs, rather than simply failing to live up to the first ideas that were articulated at the global policy level. While none of the resulting REDD+ initiatives in SW Ghana are 'schoolbook' examples of reducing deforestation and forest degradation through carbon finance based on verified emissions reductions, they are actively changing local practice of tropical forest conservation. Moreover, even when it is too early to tell if those REDD+ projects or programs managed to create a breakthrough in entrenched issues of poverty, social exclusion and a lack of rights, we do see increased attention for these issues, also on a global level.

Ambiguous results do not mean that REDD+ merely reinforced a status quo or contributed to "business as usual". Confronted with REDD+, local actors used their situated agency to integrate the meaning, competences, and materiality of global REDD+ in locally established practices of conservation, tree planting, agro-forestry, and integrated landscape management. This enabled them to absorb elements of these practices in REDD+, as they re-negotiated and shaped REDD+ in SW Ghana. In turn, the intermediary global-local actors that initiated and led these REDD+ introductions acted like "spiders" in the web between the global and local levels. They channeled ideas, information and resources from the global to the local levels, chose sites for introduction of REDD+ and recruited local actors for implementation.

The case illustrates how global policy on REDD+ can reach local levels of governance but also what the challenges are. Global-local actors worked from an advantageous situation because they had access to REDD+ ideas and information, techniques and technologies and the necessary competencies to translate it to the local situation. They did, however, depend on the extent to which local actors could make REDD+ work on the ground. Local people had agency that was situated in practices that they are already involved in, and they were the ones to draw on elements which did or did not combine well with elements of REDD+ practice. One of the most important lessons from the example in SW Ghana is that global REDD+ design has underestimated the trade-offs between REDD+ effectiveness to mitigate climate change, to be fair and inclusive, and to halt deforestation and biodiversity loss. When REDD+ was enacted on the ground, this often translated to interesting initiatives with local communities that could combine goals of social development, conservation, and climate mitigation. Whether these local initiatives can in turn provide the basis for a more global answer to political and economic drivers of deforestation is still an open question.

Author Contributions: Writing—original draft, J.W.d.B.; Writing—review & editing, B.A. and J.B. B.A. and J.B. contributed to the conceptualization, writing, review, editing and supervision of this research and the writing of the paper.

Funding: This research received no external funding.

Acknowledgments: We would like to thank three anonymous reviewers for their useful input. We also would like to thank IUCN and IUCN NL to make some of the data collection possible.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. United Nations Framework Convention on Climate Change. Paris Agreement: FCCC/CP/2015/L.9/Rev.1. 2015. Available online: https://unfccc.int/documentation/documents/advanced_search/items/6911.php?priref.600008831 (accessed on 25 October 2016).
2. UNFCCC. Report of the Conference of the Parties on Its Sixteenth Session, Held in Cancun from 29 November to 10 December 2010. Addendum. Part Two: Action taken by the Conference of the Parties at Its Sixteenth Session (FCCC/CP/2010/7/Add.1). 2011. Available online: https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf (accessed on 15 December 2014).
3. UNFCCC. Report of the Conference of the Parties on Its Fifteenth Session, Held in Copenhagen from 7 to 19 December 2009. Addendum Part Two: Action taken by the Conference of the Parties at Its Fifteenth Session. (FCCC/KP/CMP/2009/Decision-/CP.15). 2010. Available online: https://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf (accessed on 14 December 2014).
4. UNFCCC. Report of the Conference of the Parties on Its Thirteenth Session, Held in Bali from 3 to 15 December 2007. Addendum. Part Two: Action Taken by the Conference of the Parties at Its Thirteenth Session (FCCC/CP/2007/6/Add.1). 2008. Available online: https://unfccc.int/node/5079 (accessed on 14 December 2014).
5. UNFCCC. Reducing Emissions from Deforestation in Developing Countries: Approaches to Stimulate Action. Draft Conclusions Proposed by the President (FCCC/CP/2005/L.2). 2005. Available online: https://unfccc.int/documents/4125. (accessed on 14 December 2014).
6. Phelps, J.; Webb, E.L.; Agrawal, A. Does REDD+ Threaten to Recentralize Forest Governance? *Science* **2010**, *328*, 312–313. [CrossRef]
7. Silva-Chávez, G.; Schaap, B.; Breitfeller, J. *REDD+ Finance Flows 2009–2014*; Trends and Lessons Learned in REDD+ Countries; Forest Trends: Washington, DC, USA, 2014.
8. Arts, B.; Kleinschmit, D.; Pülzl, H. Forest governance: Connecting global to local practices. In *Practice Theory and Research. Exploring the Dynamics of Social Life*; Spaargaren, G., Weenink, D., Lamers, M., Eds.; Routledge: Oxford, UK, 2016; pp. 202–229, ISBN 978-1-138-10151-7. Available online: https://www.routledge.com/Practice-Theory-and-Research-Exploring-the-dynamics-of-social-life/Spaargaren-Weenink-Lamers/p/book/9781438101517 (accessed on 18 May 2018).
9. Stephenson, P. Twenty years of multi-level governance: 'Where Does It Come From? What Is It? Where Is It Going?'. *J. Eur. Public Policy* **2013**, *20*, 817–837. [CrossRef]
10. Mwangi, E.; Wardell, A. Multi-level governance of forest resources (Editorial to the special feature). *Int. J. Commons* **2012**, *6*, 79–103. [CrossRef]
11. Asiyanbi, A. Mind the gap: Global truths, local complexities in emergent green initiatives. In *The International Handbook of Political Ecology*; Bryant, R.L., Ed.; Edward Elgar Publishing: Northampton, MA, USA, 2015; pp. 274–289. [CrossRef]
12. Bernstein, S.; Cashore, B. Complex global governance and domestic policies: Four pathways of influence. *Int. Aff.* **2012**, *88*, 585–634. [CrossRef]
13. Burns, S.L.; Giessen, L. Dismantling comprehensive forest bureaucracies: Direct access, the World Bank, agricultural interests, and neoliberal administrative reform of forest policy in Argentina. *Soc. Nat. Resour.* **2016**, *29*, 493–508. [CrossRef]
14. Mattei Faggin, J.M.; Behagel, J.H. Translating Sustainable Forest Management from the global to the domestic sphere: The case of Brazil. *For. Policy Econ.* **2017**, *85*, 22–31. [CrossRef]
15. Arts, B.; Babili, I. Global forest governance: Multiple practices of policy performance. In *Forest and Nature Governance*; Springer: Dordrecht, The Netherlands, 2012; pp. 111–132.
16. Behagel, J.H.; Arts, B.; Turnhout, E. Beyond argumentation: A practice-based approach to environmental policy. *J. Environ. Policy Plan.* **2017**, 1–13. [CrossRef]
17. Mattei Faggin, J.; Hendrik Behagel, J.; Arts, B. Sustainable Forest Management and Social-Ecological Systems: An Institutional Analysis of Caatinga, Brazil. *Forests* **2017**, *8*, 454. [CrossRef]

18. Lund, J.F.; Sungusia, E.; Mabele, M.B.; Scheba, A. Promising change, delivering continuity: REDD+ as conservation fad. *World Dev.* **2017**, *89*, 124–139. [CrossRef]
19. Mccall, M.K. Beyond "Landscape" in REDD+: The Imperative for "Territory". *World Dev.* **2016**, *85*, 58–72. [CrossRef]
20. Hansen, C.P.; Lund, J.F.; Treue, T. Neither fast, nor easy: The prospect of Reducing Emissions from Deforestation and Degradation (REDD) in Ghana. *Int. For. Rev.* **2009**, *11*, 439–455. [CrossRef]
21. Griffiths, T. Seeing 'REDD'? Forests, Climate Change Mitigation and the Rights of Indigenous Peoples. Update for Poznań (UNFCCC COP 14), Forest Peoples Program. 2008. Available online: http://www.forestpeoples.org/en/topics/redd-and-related-initiatives/publication/2010/seeing-redd-forests-climate-change-mitigation-a (accessed on 30 April 2017).
22. Global Witness. Safeguarding REDD+ Finance. Ensuring Transparent and Accountable International Financial Flows. February 2012. Available online: https://site-media.globalwitness.org/archive/files/library/Safeguarding%20REDD%2B%20Finance.pdf (accessed on 20 August 2013).
23. Friends of the Earth. The Great REDD+ Gamble. Time to Ditch Risky REDD for Community-Based Approaches That Are Effective, Ethical and Equitable. 2014. Available online: https://www.foei.org/resources/publications/publications-by-subject/forests-and-biodiversity-publications/the-great-redd-gamble-2 (accessed on 14 September 2014).
24. Fletcher, R.; Dressler, W.; Büscher, B.; Anderson, Z.R. Questioning REDD+ and the future of market-based conservation. *Conserv. Biol.* **2016**, *30*, 673–675. [CrossRef]
25. Angelsen, A.; Brockhaus, M.; Duchelle, A.E.; Larson, A.; Martius, C.; Sunderlin, W.D.; Wunder, S. Learning from REDD+: A response to Fletcher et al. *Conserv. Biol.* **2017**, *31*, 718–720. [CrossRef]
26. Turnhout, E.; Gupta, A.; Weatherley-Singh, J.; Vijge, M.J.; De Koning, J.; Visseren-Hamakers, I.J.; Lederer, M. Envisioning REDD+ in a Post-Paris Era: Between Evolving Expectations and Current Practice. *Wiley Interdiscip. Rev. Clim. Chang.* **2017**, *8*. [CrossRef]
27. Den Besten, J.W.; Arts, B.; Verkooijen, P. The evolution of REDD+: An analysis of discursive-institutional dynamics. *Environ. Sci. Policy* **2014**, *35*, 40–48. [CrossRef]
28. Mayers, J.; Maginnis, S.; Arthur, E. *REDD Readiness Requires Radical Reform. Prospects for Making the Big Changes Needed to Prepare for REDD-Plus in Ghana*; The Forests Dialogue: Newhaven, CT, USA, 2010.
29. FAO. *Global Forest Resource Assessment 2010*. Country Report Ghana. Available online: http://www.fao.org/docrep/013/al513E/al513E.pdf (accessed on 25 October 2016).
30. Forestry Commission of Ghana. Ghana R-PP. 2010. Available online: https://www.forestcarbonpartnership.org/sites/fcp/files/Documents/PDF/Jan2011/Revised_Ghana_R-PP_2_Dec-2010.pdf (accessed on 14 September 2014).
31. Shepherd, G. *The Relationship between Forest Landscapes and Livelihoods. Ongoing Work in the 'Livelihoods and Landscapes' Programme' (LLS) in Ghana*; IUCN: Gland, Switzerland, 2008.
32. Government of Ghana. Ghana's Intended Nationally Determined Contribution (INDC) and Accompanying Explanatory Note. 2015. Available online: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/GhanaFirst/GH_INDC_2392015.pdf (accessed on 25 October 2016).
33. Shove, E.; Pantzar, M.; Watson, M. *The Dynamics of Social Practice. Everyday Life and How It Changes*; Sage: London, UK, 2012.
34. Arts, B.; Buizer, M. Forests, discourses, institutions. A discursive-institutional analysis of global forest governance. *For. Policy Econ.* **2008**, *11*, 340–347. [CrossRef]
35. Somorin, O.A.; Brown, H.C.P.; Visseren-Hamakers, I.J.; Sonwa, D.J.; Arts, B.; Nkem, J. The Congo Basin forests in a changing climate: Policy discourses on adaptation and mitigation (REDD+). *Glob. Environ. Chang.* **2012**, *22*, 288–298. [CrossRef]
36. Leipold, S. Creating forests with words—A review of forest-related discourse studies. *For. Policy Econ.* **2014**, *40*, 12–20. [CrossRef]
37. Moomaw, W.R.; Bhandary, R.R.; Kuhl, L.; Verkooijen, P. Sustainable Development Diplomacy: Diagnostics for the Negotiation and Implementation of Sustainable Development. *Glob. Policy* **2017**, *8*, 73–81. [CrossRef]
38. Arts, B.; Behagel, J.; van Bommel, S.; de Konin, J.; Turnhout, E. Chapter 1. Prelude to Practice: Introducing a Practice Based Approach to Forest and Nature Governance. In *Forest and Nature Governance. A Practice Based Approach*; Arts, B., Behagel, J., van Bommel, S., de Konin, J., Turnhout, E., Eds.; Springer: Dordrecht, The Netherlands, 2014.

39. Van der Arend, S.; Behagel, J. What participants do: A practice based approach to participation in two policy fields. *Crit. Policy Stud.* **2011**, *5*, 169–186. [CrossRef]
40. Bevir, M. *New Labour: A Critique*; Routledge: London, UK, 2005.
41. Arts, B.; De Koning, J. Community Forest Management: An Assessment and Explanation of its Performance Through QCA. *World Dev.* **2017**, *96*, 315–325. [CrossRef]
42. Cleaver, F.; De Koning, J. Furthering critical institutionalism. *Int. J. Commons* **2015**, *9*, 1–18. [CrossRef]
43. Stern, N. *Stern Review: The Economics of Climate Change*; Cambridge University Press: Cambridge, UK, 2006.
44. Angelsen, A.; Brown, S.; Loisel, C.; Peskett, L.; Streck, C.; Zarin, D. *Reducing Emissions from Deforestation and Forest Degradation (REDD): An Options Assessment Report*; Meridian Institute: Washington, DC, USA, 2009.
45. Ministry of Lands & Natural Resources. *Readiness Preparation Proposal Ghana*; Government of Ghana: Accra, Ghana, 2010.
46. Ministry of Lands & Natural Resources. *Ghana National REDD+ Strategy*; Government of Ghana: Accra, Ghana, 2015.
47. Forest Trends. Biomass Map of Ghana. 2011. Available online: https://www.forest-trends.org/publications/biomass-map-of-ghana/ (accessed on 25 October 2016).
48. IUCN. Mapping the Health of Forest Reserves in Ghana. Forest Brief No. 2. 2016. Available online: https://www.iucn.org/sites/dev/files/content/documents/20160729_iucn-forest-brief-no-2_web.pdf (accessed on 25 October 2016).
49. Intergovernmental Panel on Climate Change (IPCC). *Land Use, Land Use Change and Forestry*; IPCC Special Report; IPCC: Geneva, Switzerland, 2000; p. 11.
50. Hum, J. Indigenous Knowledge and Biodiversity Conservation and Management in Ghana. *Ecology* **2006**, *20*, 21–30.
51. The Forests Dialogue. *Implementing Redd+ In Ghana: Contextualisation and Some Challenges. Background Paper for REDDplus Readiness Field Dialogue in Ghana*; The Forests Dialogue: Newhaven, CT, USA, 2009.
52. Skutsch, M.; Turnhout, E.; Vijge, M.J.; Herold, M.; Wits, T.; Den Besten, J.W.; Balderas, A. Options for a national framework for benefit distribution and their relation to community-based and national REDD+ monitoring. *Forests* **2014**, *5*, 1596–1617. [CrossRef]
53. Ministry of Lands and Natural Resources. *Climate Investment Funds. Forest Investment Program*, version 3.5; Ministry of Lands and Natural Resources: Accra, Ghana, 2012.
54. Government of Ghana. Timber Resource Management Act (/). 2002. Available online: http://www.fcghana.org/library_info.php?doc=47&publication:Timber%20Resources%20Management%20Act%20617%20(Amendment)%20Act,%202002 (accessed on 25 October 2016).
55. Dumenu, W.K.; Samar, S.; Mensah, J.K.; Derkyi, M.; Oduro, K.A.; Pentsil, S.; Nutakor, E.; Foli, E.G.; Obeng, E.A. *Benefit Sharing Mechanism for REDD+ Implementation in Ghana. Consultancy Report*; Forestry Commission: Accra, Ghana, 2014.
56. Nyame, S.K.; Okai, M.; Adeleke, A.; Fisher, B. *Small Changes for Big Impacts: Lessons for Landscapes and Livelihoods from the Wassa Amenfi West Landscape, Ghana*; IUCN: Gland, Switzerland, 2012.
57. Gockowski, J.; Sonwa, D. Cocoa intensification scenarios and their predicted impact on CO_2 emissions, biodiversity conservation, and rural livelihoods in the Guinea rain forest of West Africa. *Environ. Manag.* **2011**, *48*, 307–321. [CrossRef]
58. FAO. *Climate Smart Agriculture. Resource Book*; FAO: Rome, Italy, 2010.
59. Government of Ghana. Ghana Cocoa REDD+ Programme GCFP. The Development of Ghana's Emission Reductions Implementation Plan. Draft Implementation Plan Report; 2016. Available online: http://fcghana.org/userfiles/files/redd/GCFRP_draft_Implementation_Plan_2016.pdf (accessed on 25 April 2017).
60. Forest Carbon Partnership Facility. 2014 Annual Report. 2015. Available online: https://www.forestcarbonpartnership.org/sites/fcp/files/2014/october/FCPF%20Annual%20Report%202014.pdf (accessed on 25 October 2016).
61. Nielsen, T.D. From REDD+ forests to green landscapes? Analyzing the emerging integrated landscape approach discourse in the UNFCCC. *For. Policy Econ.* **2016**, *73*, 177–184. [CrossRef]
62. IISD. *Carbon Fund Approves REDD+ Proposals from DRC, Ghana, Mexico and Nepal*; IISD: Winnipeg, MB, Canada, 2014.
63. Assare, R.A.; Kyei, A.; Mason, J.J. The community resource management area mechanism: A strategy to manage African forest resources for REDD+. *Philos. Trans.* **2013**, *368*, 20120311. [CrossRef]

64. Ministry of Lands and Natural Resources. *Ghana Forest and Wildlife Policy*; Government of Ghana: Accra, Ghana, 2012.
65. Katoomba, I.V. Sweetening the Deal for Shade-Grown Cocoa: A Preliminary Review of Constraints and Feasibility of 'Cocoa Carbon' in Ghana. 2009. Available online: https://rmportal.net/library/content/translinks/translinks-2009/forest-trends/paper_ghanacocoacarbon.pdf/view (accessed on 10 January 2012).
66. Olam and Rainforest Alliance Announce World's First Climate-Friendly Cocoa. 2011. Available online: https://www.olamgroup.com/news/all-news/press-release/olam-and-rainforest-alliance-announces.html (accessed on 25 October 2016).
67. Agyei, K.; Agyeman, V.K.; Asare, R.A.; Asante, W.A.; Benefoh, D.T.; Blaser, J.; Damnyag, L.; Deppeler, A.; Feurer, M.; Foli, E.G.; et al. REDD+ in Agricultural Landscapes: Evidence from Ghana's REDD+ process. Available online: https://www.bfh.ch/fileadmin/data/publikationen/2014/1_Blaser_REDD-_in_Agricultural_Landscapes_in_Ghana.pdf (accessed on 25 October 2016).
68. The Forest Dialogue. *Giving REDD+ Life Integrating REDD+ with Broader Development Goals*; The Forest Dialogue: Newhaven, CT, USA, 2012.
69. The Forests Dialogue. *Investing in REDD+, Consensus Recommendations on Frameworks for the Financing and Implementation of REDD-Plus*; The Forest Dialogue: Newhaven, CT, UK, 2010.
70. The Forest Dialogue. *Investing in REDD-Plus: Consensus Recommendations to the IWG-IFR*; The Forest Dialogue: Newhaven, CT, USA, 2009.
71. The Forests Dialogue. *Beyond REDD. The Role of Forests in Climate Change*; The Forest Dialogue: Newhaven, CT, USA, 2008.