



Envisioning REDD+ in a post-Paris era: between evolving expectations and current practice

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From its advent in 2005 within global climate change negotiations, reducing carbon emissions from deforestation and other forest-related activities (so-called REDD+) has been experimented with in developing country contexts for over a decade now, with a wide array of expectations coming to be associated with it. Three consecutive conceptualizations are identifiable: carbon-centered, where REDD+ is primarily a climate mitigation strategy; co-benefits-centered, where REDD+ becomes a triple win solution for climate, biodiversity and communities; and landscape-centered, where REDD+ activities are embedded in integrated sustainable land-use approaches. In assessing such evolving expectations against existing REDD+ experiences, a mixed picture emerges. Some expectations, specifically relating to forest carbon financing, are not being adequately met, while others, notably the delivery of co-benefits, hold out more promise. Yet this also highlights a potential paradox facing REDD+. While there is growing recognition that co-benefit generation is key, and that piece-meal, forest-carbon focused REDD+ interventions are unlikely to address the complex causes of tropical forest loss, forest carbon is still being foregrounded in measuring and reporting on REDD+ performance, and in generating results-based payments (even as these aspects remain challenging). This implies, however, that the future of REDD+ may lie not in one conceptualization coming to dominate, but rather in co-existence of heterogeneous practices. REDD+ may end up as a patchwork of projects and practices with different foci and financing mechanisms. Although this cannot prevent trade-offs, such a heterodox REDD+ may provide building blocks for the polycentric governance of the world's remaining tropical forests. © 2016 The Authors. *WIREs Climate Change* published by Wiley Periodicals, Inc.

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INTRODUCTION

In the collective global challenge posed by climate change, the idea of reducing or avoiding carbon emissions through forest conservation and sustainable use has attracted considerable attention. The global mechanism REDD+ has been, arguably, the most prominent site of multilateral political negotiations and activities on the ground with regard to mitigating forest-related carbon emissions. 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.’¹ It has been negotiated under the United Nations Framework Convention on Climate Change (UNFCCC) since 2005, as a mechanism to compensate developing countries for their efforts to reduce forest-related emissions.² Over the years, multiple REDD+ activities have been initiated, with bilateral and multilateral support from the World Bank and the United Nations (UN) REDD program. This has resulted in the development of national REDD+ strategies and in execution of more than 1000 REDD+ activities on the ground in developing countries by the end of 2015.³

In initial debates on REDD+ (then referred to as RED—Reducing Emissions from Deforestation), reducing carbon emissions through preventing further deforestation was portrayed as being relatively simple and efficient compared to other climate change mitigation strategies.⁴ In this relatively simple conceptualization, developing countries would receive financial support for reducing emissions from forest loss, calculated at the national level against an established baseline or reference level. This attracted a range of stakeholders, who were optimistic about the potential of REDD+ to offer a win-win solution for both climate and forests, and who considered REDD+ as an unprecedented opportunity to bring political attention and new financing for tropical forest conservation.^{5,6}

Almost in parallel, another conceptualization emerged, which emphasized not a double but a triple-win REDD+. In this vision, the emphasis was not only on the potential of REDD+ to lower carbon emissions and conserve forests, but also to improve livelihoods of forest-dependent communities, thereby facilitating poverty reduction and sustainable development in countries in which REDD+ interventions were to take place (so called ‘non-carbon or co-benefits’). This triple win conceptualization also attracted different stakeholders within the development community, who valued the benefits that REDD+ could

provide for forest communities,^{7–9} and for its potential role in improving forest governance.¹⁰

Conceptualizations of REDD+ have again shifted in recent years, this time to include a landscape approach to REDD+, which emphasizes the importance of governing landscapes (including forests, agriculture and other land uses) from an integrated perspective and including relevant stakeholders and sectors.^{11,12} In this third conceptualization, REDD+ is envisioned to serve as a catalyst for more integrated ‘climate smart development’ pathways in forested landscapes of tropical countries, particularly at the sub-national or jurisdictional level.^{13–15} This, however, will require REDD+ to go even further beyond the relatively simple focus on reducing carbon emissions from deforestation that it started with, and encompass a wide variety of co-benefits in a wide variety of land uses.¹⁶

Over the years, the shifting conceptions of REDD+ have garnered not just support, but also criticism. From the outset REDD+ has been fiercely debated in both scholarly literature and policy practice.^{17–21} This article thus undertakes a timely assessment of the current state-of-the-art understanding of whether and how REDD+ has lived up to the various expectations associated with it. It also assesses what the gaps between evolving expectations and experiences might imply for the future evolution of REDD+ in a post-Paris era.

Such a stocktaking exercise is timely, given the prominence accorded to REDD+ in Article 5 of the agreement reached during the 21st Conference of the Parties (COP 21) of the UNFCCC in Paris in 2015.²² It is particularly important in light of the potential role that forest-based mitigation is likely to play in meeting the long-term climate change mitigation goal of remaining ‘well below’ 2°. ²² It is also relevant in the context of meeting the Sustainable Development Goals agreed in 2015, in particular Goal 15.2 that aims to promote sustainable forest management, restore degraded forests, and halt deforestation by 2020, which was linked to REDD+ at COP 21.^{22,23}

EVOLVING EXPECTATIONS AND EXPERIENCES: ASSESSING THREE CONCEPTUALIZATIONS OF REDD+

We turn here to assessing the extent to which the evolving expectations associated with the three conceptualizations of **carbon, co-benefit, and landscape-centered** REDD+ are being realized. In doing so, we focus in particular on *financing* for REDD+, and the establishment of national-level *measuring, reporting,*

and verification (MRV) systems intended to report on performance, as two necessary elements in converting REDD+ into reality. We also touch upon other aspects, as relevant, including REDD+ governance arrangements and its engagement (or not) with broader deforestation drivers.

Carbon-Centered REDD+: Assessing Expectations and Experiences

As we outline above, the first conceptualization of REDD+ relates to its promise to provide an efficient and effective way to reduce or avoid forest-related carbon emissions and thereby mitigate climate change, while at the same time conserving forests. However, incentivizing this depends upon the establishment of a viable financial mechanism for REDD+. The Warsaw Framework, agreed to at the UNFCCC COP 19 in Warsaw, specifies that REDD+ finance will support developing countries in three sequential phases of REDD+ implementation: (1) readiness, (2) demonstration activities, and (3) results-based actions. This implies that, before payments for verified forest-carbon emissions reductions can flow, some preparatory *ex ante* finance is needed for countries to 'get ready for REDD+' through developing national REDD+ strategies and establishing institutional arrangements, and building technical capabilities for, among others, setting up MRV systems.^{24,25} Only then can result-based payments occur.

To date, about 90% of all REDD+ finance, for such stages, has come from public sources.^{26–28} This has included, for instance, funding from the UN-REDD programme, the World Bank's Forest Carbon Partnership Facility (FCPF); and national government programmes, such as from Norway or Germany's REDD+ Early Movers Programme. In line with the Warsaw rules, most of this finance has gone to national governments in developing countries.^{25,29} At this moment, however, the level of finance is insufficient. Currently, pledged finance for REDD+ only amounts to less than half the estimated supply of carbon credits, assuming a standard price of USD 5/tonne of CO₂ (a price used, for instance, by the FCPF), and also assuming that all finance goes to phase 3 to pay for verified reduced emissions and not to preparatory capacity building.²⁸ Besides public funding for REDD+, available private funding has been disbursed through voluntary carbon markets. In the absence of including forest credits in compliance markets, where entities with legally set emission obligations might use REDD+ offsets as one potentially efficient and flexible way of reaching their targets, voluntary carbon markets are currently the only

place wherein REDD+ credits are being traded. The only state-driven market where forest offsets might be used in the near future is California's cap-and-trade market that plans to include REDD+ offsets from 2018 on.

The current financial situation of REDD+, including public funding and the voluntary carbon market, is a clear indication that the ambitions related to REDD+ in providing payments for avoiding or reducing emissions from forests may not be realized. This is mirrored in the international negotiations where no decision regarding the finance of REDD+ has been made but instead the compromise formula is being used that funds should 'come from a variety of sources, public and private, bilateral and multilateral, including alternative sources.'³⁰ Consequently, as many studies have pointed out, REDD+ will not be able to easily incentivise change away from deforestation and forest degradation because the opportunity costs are so high that REDD+ is unable to compete with other, less sustainable, land uses.^{31–35} This implies that while countries are getting ready for REDD+ and are preparing to supply carbon credits, it is unclear what exactly they are getting ready for, in terms of the financial mechanisms to be put in place, the conditions attached to it, and whether there will be sufficient finance available.³⁶ According to Vijge et al.,³⁶ this has created a wait-and-see attitude among developing countries.

This also has implications for the widely held view (and criticism) that REDD+ embodies a market-based and neoliberal approach to environmental governance, whereby forest carbon emissions are to be valued and made into a tradable commodity.³⁷ The process of commodification implies commensuration across diverse types of carbon emissions, regardless of the location, or social conditions of their generation, so that they can be traded and exchanged.³⁸ According to many, this is risky because it could result in forests only being valued for their carbon content, a process termed carbonification³⁷ or carbonization,^{36,39,40} thereby neglecting local realities and the needs of forest-dependent communities.^{21,41,42} These criticisms resonate with broader debates and critiques of a 'Payments for Ecosystem Services' (PES) approach to environmental governance. REDD+ is often seen as one of the most prominent current examples of PES approaches, since it aims to pay developing countries for providing the environmental service of mitigating forest-related climate emissions.^{43–45} Further criticism has emerged about the potential of REDD+ to become an offset mechanism for developed countries to compensate

their own poor greenhouse gas (GHG) mitigation performance.^{40,46}

However, in the absence of a global compliance market for forest carbon, and with the current low demand for and price of carbon, the claim that REDD+ is contributing to a large-scale commodification of the forest remains empirically unfounded. In fact, the forest is already very much commoditized and has been brought under global extractivist markets, unrelated to REDD+.¹⁹ Moreover, it has also been argued that avoided emissions have not (yet) been fully turned into a commensurable commodity in REDD+: avoided emissions from forests are not all treated the same, and the location and conditions of production do matter.³⁸ Particularly at the project level, as we discuss in more detail later, results-based finance and carbon transactions do not yet take center stage.³⁴

In addition to financing and marketization aspects, the extent to which REDD+ will meet the objectives of climate change mitigation depends also on the development of carbon accounting methodologies, and the establishment of MRV systems. Carbon accounting has thus been centre stage in policy and scholarly debates, on-the-ground interventions, and REDD+ readiness activities.^{47,48} Data and methods need to be robust for countries to report REDD+ performance since REDD+ result based payments will only be granted on the basis of the adequate measurement, reporting and verification of avoided carbon emissions. As such, experts have suggested that accounting and MRV systems need to stay focused on carbon-related estimation only.⁴⁹

MRV relating to assessments of forest carbon stocks and changes is, however, a complicated matter. As much scholarly analysis has documented, monitoring and accounting technologies, approaches, and technical and institutional capacities are unevenly distributed across scales, domains and REDD+ countries.^{40,50–57} The availability of robust and credible data, particularly in developing countries, remains a key challenge, given uncertainties and political considerations associated with calculating baselines or reference levels against which to assess REDD+ performance. This is also the case in determining the scale (national, sub-national, or local) at which to account for avoided carbon emissions. Despite such challenges, most technical MRV experts increasingly believe that reliable systems that assess stocks and flows of carbon at a national scale are feasible and countries' forest monitoring capacities have significantly improved.⁵⁶

A growing body of work in the critical social sciences has highlighted, however, the political

implications of the debates around carbon accounting and MRV systems, including those pertaining to issues of data availability, reliability and integration. Such writings note the political salience that accounting rules and outcomes acquire when financial rewards become linked to them,^{54,58} even though they continue to be framed as technical matters to be negotiated and institutionalized within expert settings.^{40,50} A related strand of work notes that the requirements for stringent MRV systems may also lead to unequal access to REDD+ interventions in developing countries, as some countries have greater capacity to establish such systems and/or to negotiate their content.⁵⁰ Combined with the current focus on carbon and the mostly national scale used to balance stocks and flows of carbon, this would suggest that through MRV systems, REDD+ may end up reproducing existing inequalities between experts and administrators and local forest dependent actors.

Taking into account the issues discussed in relation to carbon-centered REDD+, it is evident that the early win-win enthusiasm for REDD+ was exaggerated: it has not proven to be a simple and efficient way to mitigate climate change or conserve tropical forests. We turn next to the second conceptualization of REDD+, where the focus shifts from carbon to also include co-benefits.

Co-Benefit-Centered REDD+: Assessing Expectations and Experiences

As we pointed out above, from early on, REDD+ was expected to not only help to mitigate climate change and conserve forests but also to deliver environmental and social benefits, such as contributing to livelihoods, sustainable development, enhanced governance, and biodiversity conservation. These are referred to collectively as co-benefits or REDD+ safeguards.^{11,12,59} There is an important but subtle difference between these two notions: while the idea of safeguards (anchored in the UNFCCC guidance on REDD+) focuses on the prevention of harm, a push for co-benefits from REDD+ requires it to do more good, thus creating a positive externality.

Although there are currently no specific REDD+ payments linked to co-benefits at the international level, countries are strongly encouraged to actively pursue such benefits in their national-level REDD+ implementation according to their specific needs, interests and national circumstances.⁶⁰ This call is also reflected in several policy documents at the national level, suggesting widespread support for the importance of co-benefits, including through involving local communities in the design and monitoring

of REDD+.⁶¹ However, the rather centralized design of REDD+ as specified in the UNFCCC Warsaw Framework may prevent such benefits from being realized in practice.^{20,62} Some argue that the financial resources that will flow to developing countries may incentivize national governance to recentralize forest governance, thereby undermining any potential positive effects of earlier decentralization efforts. Others stress that decentralization of forest management is not necessarily favorable to local communities and only works better under very specific circumstances.⁶³ Some go further in supporting current recentralization efforts and calling for a stronger national involvement in REDD+ governance, given that formerly decentralized governance arrangements are seen, in such a view, as problematic in generating co-benefits.⁶⁴ What is evident is that it will be up to national governments to decide to what extent and how local actors receive results-based payments from REDD+. As such, concerns persist that REDD+ funds will remain at national (rather than subnational or local) levels.^{20,62,65–67}

Extensive REDD+ literature has also demonstrated that the delivery of co-benefits requires appropriate governance arrangements, including institutional and contract design.^{68,69} Doing this effectively and equitably, however, remains a challenge, particularly for poorer countries where governance is weak, corruption often prevalent and enforcement feeble.^{10,58,70,71} REDD+ can therefore also be seen as a large-scale governance experiment or an attempt at state building in those areas where the state has historically been weak.⁷² Similarly, while stakeholder participation is mentioned in most project documents and minimum requirements of free, prior and informed consent (FPIC) in implementing REDD+ projects are mostly adhered to, the participation of local communities in the decision-making and design of REDD+ projects varies significantly across projects.⁷³ Furthermore, when questions of access and inclusion stem from contested land tenure-related national policies, REDD+ interventions cannot resolve these.^{74–76} Initial assessments do demonstrate, however, that socioeconomic benefits are limited when REDD+ implementation disregards the skills, interests and potential of local actors through top-down, predefined development strategies.⁷⁷

Notwithstanding these problems and challenges facing the implementation of REDD+ with broader benefits, there are clear signs that co-benefits are being taken seriously in the implementation of REDD+. This means that to date, there is little evidence of extensive carbonization occurring in

practice. In contrast, some research has shown that the potential to generate biodiversity and community benefits are among the most important reasons for the selection of specific areas for REDD+ demonstration activities.⁷⁸ Furthermore, though actual poverty reduction impacts of REDD+ projects remain limited,⁷³ most REDD+ projects focus more strongly on socioeconomic and environmental co-benefits than on carbon benefits.³⁴

This is also evident from the fact that only around 20% of the REDD+ projects are currently engaged in actual carbon transactions and of these, only a few rely solely on finances from such transactions.³⁴ Moreover, 81% of all REDD+ projects that involve carbon transactions are also certified by a standard for co-benefits such as the Climate, Community Biodiversity standard (CCB), the Forest Stewardship Council (FSC) or Rainforest Alliance.⁷⁹ In part, this can be explained by the fact that many REDD+ projects already existed as nature conservation or integrated conservation and development projects prior to the introduction of REDD+.⁷⁵ According to some, however, this state of affairs raises questions about the additionality of REDD+, and hence the effectiveness of REDD+ as a climate mitigation strategy.³⁴

Thus, to date, we see implementation of REDD+ based on different sources of financing, which target the delivery of a wide variety of social, economic, and biodiversity benefits without an exclusive focus on carbon. In light of the future financial prospects for REDD+ vis-à-vis carbon benefits noted above, this diversity of funding may prove a useful strategy for securing the necessary financing for diverse REDD+ interventions, while at the same time ensuring the delivery of co-benefits.⁷⁰ Such a strategy would also fit well with recent developments within REDD+ negotiations in an international context, where it is increasingly linked to sustainable development imperatives. In the Paris Agreement, for example, the link between REDD+ and the sustainable development goals is noted,^{22,23} and current donor preferences also reflect a strong emphasis on securing social and sustainable development benefits from REDD+.

In considering the prospects that REDD+ will generate co-benefits, a related issue has been whether such benefits are also to be monitored, reported on, and verified, at what level, and to what end. To date, the mainstream understanding (also within the UNFCCC) has been that co-benefits are important for REDD+, but are not to be included in MRV systems. Although they may be included as safeguards or conditions for payment, they will not be used to

determine the payment itself. Indeed, this seems to be the dominant trend in practice as well, given that there are very few initiatives designed explicitly to monitor co-benefits.^{55,61,80}

Furthermore, most developing countries, even those with relatively advanced forest monitoring systems, lack the capacity to implement co-benefit and community-based monitoring.^{55,81} Capacities for social monitoring that covers, among others, rights, participation and other social benefits, and environmental monitoring that includes biodiversity, soil, water and other ecosystem services are sometimes in place, but they have usually been developed by different expert communities who remain largely disconnected from each other.^{9,11} There are some suggestions to aim for such interdisciplinary integration, at least for environmental aspects. Scholars have noted, for example, that many of the same remotely sensed and field-based datasets that are being leveraged to measure changes in forest carbon emissions can also be used to assess changes in biodiversity, hydrology and water resources, and soil resources. However, this may not be possible for social parameters. Thus, while it may be possible to take advantage of multiple data streams, including field measurements from community-based monitoring, and remote sensing data analysis,⁸¹ and use them for inter-calibration and validation,^{82,83} there remains a problematic disconnect between the widely available large-area data on forest change derived from remote sensing⁸⁴ and the fine-scale data needed to monitor processes and changes in social conditions.⁵⁵ While some observers assess that progress in this realm has been made,⁵⁶ another observed tendency is for governments and other actors to shy away from taking on monitoring tasks in situations where key datasets are missing and basic capacities need to be established, unless there are clear (financial) incentives to do so. Finally, the issue of sovereign decision-making comes up again, as governments in tropical forest countries rightly claim that co-benefits are also not systematically measured or linked to any financial transfers in countries of the global North. This suggests that debates relating to accounting for REDD+ (both for carbon, but also for co-benefits that go beyond carbon) are likely to continue in the foreseeable future.

In sum, therefore, existing experience highlights that, while on the project-level, REDD+ is characterized by a strong focus on co-benefits, developments relating to finance and MRV systems continue to be primarily concerned with carbon. Results-based payments are to be granted relative to avoided carbon emissions documented through sufficient and credible evidence generated by accounting and MRV. If co-

benefits remain excluded from the accounting and financing architectures of REDD+ and are not seen as results to be awarded with payments, REDD+ may yet result, in certain instances, in a carbonization of forest governance.³⁶

This suggests that in practice, rather than generating triple wins, REDD+ interventions are likely to be characterized by trade-offs between forest conservation, climate change mitigation, and local development and livelihood benefits.^{85–88} For example, research has shown that the forests to be conserved when aiming for maximum carbon emission reduction impact will not always be the most urgent areas for biodiversity conservation.^{89–93} Fears are also being raised that the establishment of REDD+ related conservation areas will lead to the expulsion of local forest dependant people as was recently observed in Lao PDR.⁹⁴

As we have discussed in this section, the implementation of co-benefit-centered REDD+ reveals a mixed picture, with evidence of REDD+ taking co-benefits into account at the project level, but at the same time, a persistence of trade-offs and a continued foregrounding of carbon in REDD+ finance and MRV systems. We turn next to the expectations and current experiences with the newest conceptualization: landscape-centered REDD+.

Landscape-Centered REDD+: Assessing Expectations and Experiences

As we noted in the introduction, the third, most recent, conceptualization of REDD+ widens its scope of activities and/or the context within which it is to be conceived and implemented considerably. In this third, landscape-centered conceptualization of REDD+, the linkages between forests and other forms of land use, particularly agriculture, come to the fore, with concurrent extensive focus on engaging relevant stakeholders beyond traditional forest-related multi-level decision-making arrangements.^{95–97} This implies that REDD+ decision-making has to go beyond forest-related ministries and departments^{8,98} and become integrated with other policy areas that affect stocks and flows of forest carbon, including drivers of deforestation.^{53,65}

The most important direct driver of tropical deforestation is commercial agriculture, in particular large-scale industrial agriculture.^{99–102} Commercial logging, selective logging activities, illegal logging, fuel wood collection, and charcoal production are other known drivers. So far, however, REDD+ has not been able to effectively address the political economy underlying these drivers, among others because decision-makers prioritize short-term economic

priorities and entrenched powerful interests.^{103–105} The problem of conflicting government agendas undermining REDD+ policies is well documented, especially in relation to land tenure,^{76,106} and economic activities such as infrastructure development and mining.¹⁰⁷ Even in Indonesia, a forerunner of REDD+ with strong political support,¹⁰⁸ there is opposition to zero-deforestation pledges by palm oil companies because of the potential socio-economic impacts. The consequence is that, even if forest policies are effective in enhancing carbon stocks, they are likely to ultimately fail because the drivers of deforestation remain unaddressed.¹⁰⁹

Those advocating for a landscape approach to REDD+ note that for it to be able to address drivers, REDD+ needs to be situated within the broader context of multi-level climate, forest, and biodiversity policies, and the broader dynamics of land use in forested landscapes in tropical countries.² Specifically, such a conceptualization envisions REDD+ becoming integrated into wider decision-making about land use, beyond that pertaining directly to forests. Our current state of understanding with regard to such an approach in practice includes, predominantly, initiatives for cross-sectoral integration in national contexts such as Indonesia and Brazil. In both these contexts, the expansion of industrial agriculture is a significant driver of deforestation, and land-use decision-making is heavily influenced by large and powerful agribusiness companies.^{78,110} REDD+ implementation in these contexts has thus also been characterized by efforts to incentivize agricultural private sector stakeholders to reduce their land-use emissions and impacts on deforestation, including through involvement in developing Nationally Appropriate Mitigation Actions (NAMAs) under the auspices of the UNFCCC.¹¹¹ Such initiatives have taken the form of zero deforestation commitments, agricultural commodity roundtables, or deforestation-free supply chains, which are intended to be implemented in a landscape across commodity production areas.^{102,112}

Less well documented to date are examples of landscape approaches to REDD+ being tried in contexts where agribusiness companies *do not* play a substantial role, and where deforestation is driven by small-scale or subsistence agriculture. While in some such cases, local REDD+ projects may be scaled-up and may influence decision-making across agricultural and multifunctional landscapes, most REDD+ projects are insufficiently connected with national or jurisdictional approaches to stimulate such broader change.^{34,113}

Other key stakeholders that influence land-use decision-making are the regional authorities or

provincial governments, who influence decision-making within their jurisdictional areas. Again, Brazil and Indonesia are often cited as examples where regional authorities have taken a leading role in exploring landscape approaches,^{110,114} particularly because regions from both countries were involved early on in the Governor's Climate and Forest (GCF) taskforce. These early jurisdictional approaches are now catalyzing new initiatives such as Low Emission Rural Development (LEDR), which recommends combining efforts led by regional governments to decrease land-based emissions across a particular jurisdictional area, with efforts by the agricultural private sector to decrease emissions. Another, similar, conceptualization is the 'green economy' approach, through the creation of 'productive, profitable, and sustainable landscapes that sequester and store more carbon and will enable enhanced delivery of environmental services.'¹¹⁵ For REDD+ this would imply the development of business models that are in line with sustainable forest management practice, thereby shifting the focus of REDD+ from a conservation to a sustainable livelihood strategy.¹¹⁶

Despite these initiatives, practice to date suggests that REDD+ has so far not effectively adopted a landscape approach. In general, plans to link REDD+ to other policy sectors such as agriculture, for example, remain vague³⁹ and the disconnect in policy, research and practice between the forest and agriculture sector remains one of key areas overlooked in REDD+.^{117,118} This means that the hoped-for transformational change towards landscape approaches to REDD+, as a trigger for more climate-smart development pathways, will remain difficult, at least in the short to medium term.^{34,103,105}

The enormity of the challenge should not be underestimated. Landscape-level REDD+ may also require integrated accounting and MRV systems that go beyond existing demands of forest carbon (and non-carbon) monitoring, to also assessing the dynamics of carbon stocks and flows in a landscape. However, the typical complexities of land-based systems, including different human impacts, past land uses, and unforeseen events such as fires and extreme weather events make assessment of their mitigation potential complicated, adding considerable complexity to accounting and MRV systems. Moreover, cropland, grassland and forestland are currently being treated separately in the IPCC land use accounting guidelines, which will make integration of such different land uses difficult.¹¹⁹ Also the issue of co-benefits will be further complicated in a landscape approach, as the variety of stakeholders, land uses,

and non-co-benefits derived from land will be more diverse.

In relation to finance, adopting a landscape approach could further catalyse the already discernible trend to combine different sources of funding in REDD+. For example, REDD+ could be aligned with existing private flows and development finance.¹²⁰ One approach has been to promote new value chains of non-timber forest products that can enhance local incomes while conserving forests.¹²¹ Agricultural value chains too, particularly of tropical commodities (e.g., cocoa and coffee) may be integrated in REDD+. ^{110,122} If REDD+ will be able to establish relationships with other markets and financial instruments, its impacts can be significant.²⁸ However, it is important to recognize that the complexity of REDD+ will nonetheless increase. Specifically, the distribution of benefits and financial rewards is likely to become increasingly demanding, complicated and difficult to justify. Although scholars and policy practitioners continue to debate policy integration in REDD+, ^{123,124} the fact that the Paris Agreement does not mention agriculture shows that an integrated, landscape approach to REDD+ is likely to remain politically contested and is still a long way to go.²³

CONCLUSION: THE REDD+ PARADOX AND MERITS OF HETEROGENEITY

Our review of the expectations and experiences associated with diverse and evolving conceptualizations of REDD+ provide a portrait of the challenges and opportunities facing REDD+ implementation in a post-Paris era. We have shown that the current level of financing is insufficient, and that currently no compliance market for forest carbon credits exists. As such, we can conclude that the expectations that carbon-centered REDD+ would be a simple and efficient mechanism for climate mitigation are not currently being met. At the same time, there is a growing recognition that REDD+ needs to generate co-benefits. Even as their delivery is challenging and there are signs of trade-offs between climate, biodiversity and social benefits, our review shows that REDD+ projects do take co-benefits into account and there is little evidence that carbon concerns are systematically dominating at the expense of communities and their livelihoods. Thus, while there is arguably still much to be desired in this area, experiences so far allow for cautious optimism that the expectations of co-benefits-centered REDD+ can be furthered. This also suggests that the fears that

REDD+ would contribute to large-scale commodification and carbonization of the forest at the expense of communities and co-benefits have not materialized.

However, before such a conclusion can be justified, we need to reconsider the relation between these two conceptualizations of REDD+ and their implementation. Carbon-centered REDD+ implementation has not yet materialized at scale, partially because of a lack of stringent and well-functioning compliance markets for carbon trading in recent years, and a viable price for carbon. These financial constraints have created a situation in which the trading of carbon credits is limited and takes place only in the voluntary market. However, in a post-Paris context, this could be set to change as article 6 of the Paris Agreement envisions a new 'sustainable development mechanism.' Whether this will include REDD+ as a market-based offset mechanism is an open issue and remains very contested in the context of the UNFCCC.¹²⁵

Nonetheless, such a mechanism is likely to again foreground carbon. REDD+ continues to have a strong focus on carbon as the basis for results-based payments, based on systems that can measure, report and verify outcomes, and there is currently no indication that the delivery of co-benefits may become included in MRV systems or in payments. Consequently, if and when results-based payments occur at scale, a potential carbonization of forest governance remains a possibility. This implies an emerging paradox for REDD+, where the failure to meet carbon-related financial expectations has created optimism about (at least) the delivery of co-benefits, yet where attempts to meet such financial expectations, for example, by establishing a global REDD+ financial mechanism, may risk existing achievements with respect to co-benefits.

The third, newest conceptualization of landscape-centered REDD+ also needs to be considered in this light, since it requires REDD+ to take into account an even wider variety of carbon and non-carbon benefits, land-uses and actors. There is recognition of the importance of going beyond carbon and beyond forests even in the (more technical) REDD+ literature that addresses carbon accounting and MRV challenges. However, such acknowledgment is routinely tempered by arguments that highlight existing financial and data hurdles to making even a carbon-centered REDD+ work.^{8,49} While a REDD+ that goes well beyond generating carbon benefits is likely to be seen as more legitimate by a broader group of actors, the potential for such a conceptualization of REDD+ to be operational and

effective remains rather limited, given the current focus on carbon in finance and monitoring.¹²⁶ As such, a carbon-centered REDD+ may increase the likelihood of effectively resolving data and financial issues, but not without risking delivery of co-benefits. In light of this, with regard to the potential for REDD+ to become a catalyst for sustainable landscapes and more ‘climate-smart development,’ our review highlights that such conceptualizations can only further exacerbate the REDD+ paradox.

This suggests that, rather than asking whether and how REDD+ can overcome implementation challenges associated with ever-broader conceptualizations, the more pertinent question becomes whether broader conceptualizations are desirable in the first place, and at what cost. Addressing this requires viewing the different concerns associated with REDD+ as more than just implementation challenges, but rather as a politically contested question of what REDD+ should be.

In considering what REDD+ should be, and its future evolution, our assessment suggests that a pragmatic and heterogeneous approach to conceptualizing and implementing REDD+ is likely to prevail. REDD+ interventions will (continue to) use forest carbon accounting data as the basis for financial

rewards, while proactively incorporating co-benefits as safeguards and as conditions for payments. Such a pragmatic approach does not place carbon and non-carbon benefits on equal footing from a global REDD+ policy, MRV or financing perspective *and* it maintains distinctions between forests and the wider landscapes in which they are situated.

In view of the diversity of REDD+ expectations and experiences discussed in our review, the idea of REDD+ serving as one coherent, integrated, top-down global financial mechanism with one (set of) objectives, is unlikely to come to pass. Instead, REDD+ may well remain a patchwork of different initiatives driven by distinct conceptualizations and associated objectives, with a focus on carbon, co-benefits or landscapes, as relevant (aligned with the merits of a more polycentric approach to governance).¹²⁷ This implies, nonetheless, that the paradoxes, dilemmas and trade-offs across diverse conceptualizations of REDD+ will remain. However, as long as there remains scope for context-specific variation and adaptation, including prioritization of co-benefits, such a pragmatic, polycentric approach may still enable REDD+ to make a distinctive and important contribution to keeping forests and their multi-functionality on the international agenda.

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