REDD+ in Theory and Practice: How Lessons From Local Projects Can Inform Jurisdictional Approaches

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Local projects for reducing emissions from deforestation and forest degradation (REDD+) were frequently designed as pilot actions to inform future upscaled initiatives. Drawing lessons from these project experiences may thus help improve the design of jurisdictional programs, which is the focus of REDD+ implementation in the Paris Agreement. Here we first scrutinize how REDD+ was historically conceptualized, the most prominent model being that of a multitier payments for environmental services (PES) scheme of "passing on" carbon mitigation responsibilities and credits across scales, from international buyers to forestland owners. Then we analyze two REDD+ project databases, ID-RECCO and GCS-REDD, using principal component and regression analysis. Among 226 conservation-oriented REDD+ projects, only 88 had planned conditional incentives to landowners—the key feature of PES. Intentions to apply PES rose after 2007, and correlate strongly with efforts to seek certification, including as a benefit-sharing strategy, and with carbon sales. Zooming closer into a portfolio of 23 local REDD+ projects that were actually implemented on the ground, we found project implementers reported conditional incentives as potentially being both the most promising and effective intervention. Likewise, treated households identified conditional incentives as comparatively effective in changing their land-use plans, while also providing above-average welfare returns. Still, these conditional incentives remained underutilized in implementation, with only one-third of the treatment intensity compared to non-conditional incentives. Project implementers cited insecure land tenure and uncertain REDD+ financial flows as key impediments to using conditional incentives. The original vision of a multitier PES model for REDD+ thus ran into both supply and demand side problems, jointly explaining the discrepancy between REDD+ theory and practice. Since jurisdictional approaches to REDD+ so far also receive only hesitant and slow climate financing flows, coming mostly in non-conditional form, and operate under forest-frontier governance with similar tenure restrictions, jurisdictions would seem well-advised to plan for conditional landowner incentives only in scenarios where the preconditions

for PES are met. Implementers of jurisidictional approaches may also want to avoid conceptualizing their new model too narrowly and prescriptively, as was arguably the case with the conceptualization of REDD+ as a multitier PES scheme.

INTRODUCTION

Forest-based emissions reductions in developing countries came to figure prominently in the 2015 Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC, 2015), known under the heading of REDD+ (reduced emissions from deforestation, forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries). In addition, a global effort to begin restoring 350 million hectares of degraded forest landscapes, known as the Bonn Challenge, was launched in 2011 (Verdone and Seidl, 2017). These two forest-based solutions have emerged as potential contributors to the objective of mitigating climate change to a temperature rise of well below 2°C (Griscom et al., 2017). However, so far, the sources and quantities of global funding for implementation of forest-based climate actions have been limited (Atmadja et al., 2018).

As enshrined in the Paris Agreement, REDD+ implementation focuses on jurisdictional scales (national with subnational in the interim) as part of countries' Nationally Determined Contributions (NDCs) for climate change mitigation. While national REDD+ programs have progressed over the last decade (Thuy et al., 2018), there was an early explosion of local (non-jurisdictional) REDD+ projects in response to the UNFCCC 2007 call for "demonstration activities" (Sills et al., 2014; Simonet et al., 2014; Duchelle et al., 2019). Simultaneously, subnational governments began to take leadership through developing so-called jurisdictional approaches to REDD+ and low-emissions development (JA) that more holistically combine policies and market-related measures (e.g., zero-deforestation commitments) into broader low-emission development strategies (e.g., Boyd et al., 2018). This new JA paradigm of comprehensive government-led approaches to regulating land use across entire jurisdictions builds on the REDD+ experience, but is partly also a reaction to widespread criticism of the "project-ification" of early REDD+ activities (Nepstad et al., 2013).

A central element for successful JA is incentives for multiple land use actors to engage in sustainable landscape management (Ros-Tonen et al., 2018; Stickler et al., 2018). Such incentives— in the case of REDD+, payments for reducing forest-based emissions at jurisdictional scales—can be conceptualized as a multitier payments for environmental services (PES) scheme of "passing on" carbon mitigation responsibilities and credits across scales, from international buyers to forestland owners. In practice, results-based payments for jurisdictional REDD+ programs have been limited to a few bilateral and multilateral initiatives, such as notably Norway's International Climate and

Forest Initiative (NICFI) launched in 2007 (Angelsen, 2017), and later Germany's REDD Early Movers programme (Pistorius and Kiff, 2015), the Green Climate Fund's recent results-based payment pilot program for REDD+, and the Carbon Fund (i.e., results-based payment) phase of the Forest Carbon Partnership Facility (FCPF).

Given the evolution of REDD+ finance and accounting to the jurisdictional scale through the Paris Agreement, REDD+ project implementers can no longer expect direct participation in international transactions with Paris-compliant carbon markets[1]. Yet, there is an opportunity to "nest" existing REDD+ projects into jurisdictional programs to contribute to higher-level emission reduction targets through local actions (Lee et al., 2018). Moreover, experiences from local initiatives on the ground can potentially become building blocks of a regional-to-national approach to REDD+, as one layer of a new polycentric approach to mitigating climate change. To realize this potential, a better characterization of these projects and their outcomes is needed, so as to understand what lessons may be relevant for the design of future NDCs and market-based mechanisms. Rigorous evaluations of early project-scale REDD+ interventions, including incentives, can help inform the design and implementation of jurisdictional-scale policies, programs, and initiatives (Duchelle et al., 2019). While we can only speculate about how well-financed national or subnational jurisdictional REDD+ schemes might function, one prudent prior step is to systematically scrutinize the *de facto* pre-existing REDD+ projects.

In the following, we aim to help fill this knowledge gap by empirically characterizing the landscape of the existing local REDD+ projects on the ground, describing how this landscape and the concept of REDD+ have evolved since the inception of the concept, and draw lessons for upscaled jurisdictional programs moving forward. In doing so, we focus on the broader-scale architecture of relations among key actors: carbon markets/ donors, project implementers, and forestland stewards/communities on the ground. Two research questions emerge. First, to what extent were specific theoretically informed *a priori* models of REDD+ implementation *de facto* applied, or did they transform when they hit the ground? Second, to what extent can we link the *de facto* adoption of REDD+ models to different implementation contexts, such as for instance the type of implementer, the length of financing horizons, or donor preferences for specific pilot actions?

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[1]See Article 6, which governs the international transfer or sale of emission reduction units. Outside of the Paris Agreement, there remain other possibilities for sale of carbon credits by projects, such as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

The remainder of this paper is structured as follows. After describing our data and methods (section Data and Methods), we will give a short history of REDD+ theory and action (section From Compensated Reduction Toward a REDD+ Model). In section Exploring Empirical Characteristics of Local REDD Initiatives, we will open-endedly explore the universe of REDD+ initiatives of the ID-RECCO database (Simonet et al., 2018a), using principal component analysis (PCA). Section Multilevel Conditionality in REDD Design? will test for possible linkages between project implementers' conditional access to financing flows (certification, carbon sales) and their own use of conditional incentives vis-à-vis landowners. Based on these findings, section A Closer Look at Implementation of REDD+ Projects zooms in to the implementer and household level, using the Global Comparative Study (GCS) on REDD+ data of the Center for International Forestry Research (CIFOR). Section Conclusions and Perspectives for Jurisdictional Approaches summarizes the findings, and discusses the implications, including for JA.

DATA AND METHODS

Data

Our empirical stocktaking of REDD+ projects will draw on two databases.

First, the International Database on REDD+ projects and programs, linking Economic, Carbon and Communities data (ID-RECCO) has been put together jointly by the Climate Economics Chair at Paris-Dauphine University (France), the French Agricultural Research Center for International Development (CIRAD), the International Forestry Resources and Institutions (IFRI, University of Michigan, United States), and more recently CIFOR. It is a centralized repository of data on REDD+ projects and programs, with up to 110 variables registered per initiative. By May 2018, it contained 467 projects and programs in 57 countries. Three hundred fifty-nine initiatives were registered as active, sixty-seven were completed before 2018, and forty-one had either not yet started, or were discontinued (Simonet et al., 2018a). ID-RECCO is mostly based on a desk assessment of secondary data, such as project development and certification documents. Notably, at the time of our analysis the most recently consolidated version of the ID-RECCO data (2018) included jurisdictional REDD+ programs that have emerged from REDD+ projects. We also selectively compare with the ID-RECCO 2016 version, so as to illustrate the most recent trends in certain variables.

Second, CIFOR's GCS REDD+ has been running since 2009 and includes a research component that collects data at the project, village and household scale on 23 REDD+ projects in Brazil, Peru, Cameroon, Tanzania, Indonesia, and Vietnam (Sills et al., 2014). The projects were planned and implemented by different types of implementers (government, NGO, private sector). They also range widely in size (from 28 to 160,000 km^2) and forest contexts (from dense primary rainforest to dry miombo woodlands). We draw primarily on data collected in

2013/2014, shortly after most projects began implementation[2]. The more detailed data on the in-field realities of projects across six countries will supplement the broader yet shallower analysis of ID-RECCO. Notably, GCS REDD+ includes six subnational jurisdictional REDD+ programs that cover entire political jurisdictions (i.e., states, provinces, municipalities or districts), and are implemented across different land-use types and included diverse stakeholders (Fishbein and Lee, 2015):

- In Brazil, Acre's State System of Incentives for Environmental Services, the Sustainable Landscapes Pilot Program in São Félix do Xingu (Pará State), and Cotriguaçu Sempre Verde (Mato Grosso State).
- In Indonesia, the Berau Forest Carbon Program and Ulu Masen REDD+ initiative in Aceh.
- In Vietnam, the Pro-Poor REDD+ initiative in Cat Tien.

While all six programs were characterized by active local governmental engagement, which is a core component of JA, all but Acre were initiated by NGOs, which had variable success in cultivating government leadership for co-implementation.

Methods

We performed all statistical analyses in R, V3.5.2 (The R Foundation for Statistical Computing, 2018). For PCA analysis, we used the *PCAmix* package (Chavent et al., 2014), since we included both numerical and categorical data. Score dimensions were exported and plotted using the ggplot2 package (Wickham, 2016). We selected a mix of simple project-descriptive variables and some that might be of particular interest vis-à-vis upscaled JA initiatives: size (area), implementer type (public, private for-profit, non-profit), continental dummy, early vs. late start of project (before 2007), relation to protected area (yes/no—y/n), project stage (planned implemented vs. terminated), denominated pilot stage of implementation (y/n), certification (y/n), sale of carbon credit (y/n), main objective (REDD vs. non-REDD), plans to use conditional local incentives (y/n), and jurisdictional status (y/n). The interpretation of the PCA is supported by qualitative and quantitative analyses of the underlying data, which are discussed but not shown. The scores of the two highest-ranked dimensions are used to test for the homogeneity of multivariate dispersion with the "betadisper" function in the *vegan* package (Oksanen et al., 2007), performing graphical and permutational F-tests of the multivariate homogeneity of group dispersion (Anderson, 2006).

To test the relationship between project characteristics and the intention to use conditional payments (**Table 2**), we performed a general linear model regression with binomial distribution and logit-link using the *glm* function in the base package of R. We initially tested each variable included in the PCA (see above) in isolation, but then fitted a multiple regression, having excluded the variables "objectives" and "sales of carbon credits" that caused problems of overfitting, and either were not significant in isolation (objective) or decreased model fit (carbon sales) due to collinearity with certification.

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[2]In 2018, a new round of GCS data were collected, in a subset of the 23 initiatives. We prioritized here the broader REDD+ project coverage in the 2013/14 data.

FROM COMPENSATED REDUCTION TOWARD A REDD+ MODEL

At the UNFCCC's 9th Conference of the Parties (COP9) in Milan in 2003, a group of researchers introduced the concept of "compensated reduction": tropical countries reducing national deforestation below an agreed-upon baseline were to receive *ex-post* compensation, thus providing them with additional incentives to curb forest loss (Santilli et al., 2005; Schwartzman and Moutinho, 2008). The proposal that gained traction in the UNFCCC featured rewards for deforestation-reducing interventions, carbon market financing, a national-level approach, and voluntary participation (Skutsch et al., 2007). The UNFCCC reviewed options for including reduced emissions from deforestation (RED) as a climate change mitigation option in the post-Kyoto commitment period, stimulated further by a 2005 joint action proposal from Papua New Guinea and Costa Rica (UNFCCC, 2005). Likewise, the Stern Review estimated that ending deforestation in eight countries responsible for 70% of global deforestation would cost only US\$5–10 billon, calling it one of the most cost-effective ways to reduce global greenhouse gas emissions (Stern, 2006).

Notably, the 1997 Kyoto Protocol had already included the RED objective of "forest preservation" in industrialized countries (o'Sullivan, 2008), and there were also a few RED focused carbon projects in developing countries prior to 2007[3]. The compensated-reduction proposal had pointed to various possible deforestation-reducing strategies on the ground: enforcing environmental legislation, providing economic alternatives, capacity building, and improving protected-area systems could all be tools that sovereign tropical nations could select (Santilli et al., 2005). A subsequent proposal by the EU Joint Research Center further related national baselines to potential compensations between countries (Mollicone et al., 2007). Also, given the importance of emissions from forest degradation due to e.g., logging, fuelwood harvest, and forest fires (Skutsch et al., 2007), a second "D" for degradation was officially added ("REDD") in 2007 at the UNFCCC COP13 in Bali (UNFCCC, 2007). Bali negotiations acknowledged the mitigation potential of enhancement of forest carbon stocks, eventually leading to the REDD+ acronym (UNFCCC, 2007).

One key REDD+ feature was the promise of access to carbon markets for large-scale financing of forest-based mitigation. The Kyoto Protocol's Clean Development Mechanism (CDM) had demonstrated that unprecedented levels of funding for climate change mitigation could be generated. Market-based financing would be needed to cover REDD+ implementation costs, although public sector multilateral funding was called for to support the enabling conditions for REDD+ (Streck et al., 2008).

[3]Caplow et al. (2011) found 20 pre-REDD+ projects that: (a) were launched between UNFCCC COP-1 and COP-13; (b) were located in developing (non-Annex I) country; (c) aimed primarily to reduce deforestation and forest degradation; (d) estimated net impact on greenhouse gas (GHG) emissions. These included projects on avoided deforestation, avoided degradation and sustainable forest management, but not those delivering carbon credits solely through afforestation/ reforestation (A/R).

Furthermore, compensated reduction and REDD+ were being discussed with national-level foci, thus allegedly differing from the CDM's project-based approach. Advantages associated with a national-level focus were lower leakage and other spatial spillover effects, lower transaction costs and greater control for developing country governments to integrate with their forest-based mitigation strategies (Skutsch et al., 2007). Limitations to a purely national-level accounting were the costs and capacities needed for developing country governments to change historic deforestation patterns, and thus be eligible for credits—along with widespread private sector reluctance to invest in these governments (Streck et al., 2008). Proposals for a "nested approach" emerged in response, envisaging simultaneous national and subnational implementation (Streck et al., 2008; Pedroni et al., 2009). Indeed, the demonstration activities called for under the Bali Action Plan (UNFCCC, 2007) largely consisted of local initiatives: hundreds of REDD+ projects have been implemented since 2007 (Simonet et al., 2014).
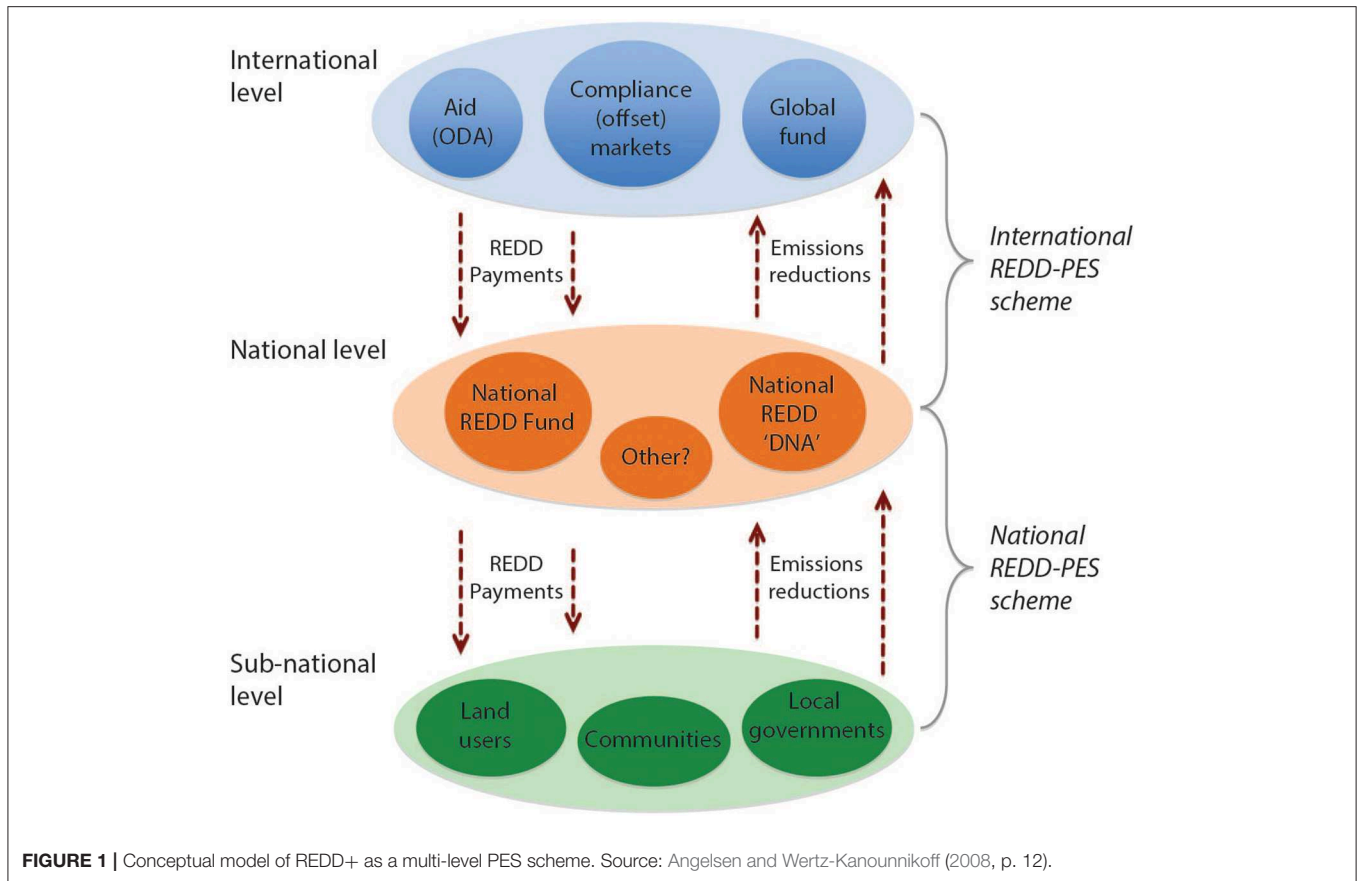
Compensated reduction was thus based on rewarding demonstrated reductions in deforestation vis-à-vis agreed-upon baselines. Conditional *quid pro quo* payments held the promise, derived from experiences in multiple sectors, to be more effective than non-conditional transfers (Ferraro and Kiss, 2002; Rawlings and Rubio, 2005; Wong, 2014). This performance-based aspect of REDD+ ever since appeared attractive vis-à-vis other conservation efforts (Angelsen, 2017).

In furtherance of the nested approach, a conceptual model for REDD+ as a multilevel system of Payments for Environmental Services (PES) was proposed (**Figure 1**): international private or public buyers of carbon credits would pay national government institutions for measured emissions reductions, who in turn would pay subnational governments, communities and local landowners for demonstrated reductions on the ground (Angelsen and Wertz-Kanounnikoff, 2008, Wertz-Kanounnikoff and Angelsen, 2009). Hence, performance-based principles would be applied not only at the level of international exchanges, but also throughout the national architecture of REDD+ (Sunderlin and Atmadja, 2009; Vatn and Angelsen, 2009).

Not only was it thus often expected that REDD+ would become an international system of conditional transfers between countries (Farley et al., 2010), but many observers had the idea that "REDD+ can be conceptualized as the world's largest experiment in payments for ecosystem services" (Corbera, 2012, p. 612). PES would, among several on-the-ground implementation potential tools, become the preferred mechanism in a "national REDD-PES scheme" (Wertz-Kanounnikoff and Angelsen, 2009). An entire new branch of literature thus started to look into how REDD+ could allegedly "learn" from past PES experiences (Bond et al., 2009; Wunder, 2009; Martin, 2010; Pagiola, 2011; FONAFIFO, 2012; Mahanty et al., 2013; Pham et al., 2014; Wong, 2014), while other studies projected REDD+ national implementation costs based on PES covering landowner opportunity costs (e.g., Olsen and Bishop, 2009; Börner et al., 2010). Some scholars made caveats about the multilevel PES model's feasibility depending on key *ex ante* preconditions—notably forestland stewards' land tenure being able to exclude third parties from access (Wunder, 2009)

FIGURE 1 | Conceptual model of REDD+ as a multi-level PES scheme. Source: Angelsen and Wertz-Kanounnikoff (2008, p. 12).

and the existence of long-term, stable REDD+ financing flows (Pagiola, 2011).

The compensated reduction proposal had already drawn attention to potential side-benefits for biodiversity associated with forest-based mitigation (Santilli et al., 2005). Subsequently, this attention broadened toward potential environmental and social risks and co-benefits associated with REDD+ and the sharing of benefits from it (e.g., Griffiths, 2007; Luttrell et al., 2013), eventually consolidated in Cancun (COP16 in 2010) into a series of REDD+ safeguards (UNFCCC, 2010).

Returning to our first research question, i.e., to what extent theoretical *a priori* models of forest-based mitigation were *de facto* implemented, we could thus already observe an incipient transformation: the originally simple concept of compensated reductions became a complex REDD+ model, with multiple implementation levels, sources of forest-based emissions, side-objectives and safeguards. Nevertheless, financing flows fell severely short of expectations: the scale of forest carbon markets remained minor (e.g., still lacking acceptance on the large European carbon market) (Norman and Nakhooda, 2014), with REDD+ finance relying much more on overseas development assistance (ODA) type of unconditional transfers (Angelsen and McNeill, 2012), including because REDD+ credits were being only incipiently accepted in the UNFCCC negotiations (Turnhout et al., 2017). Multi-level REDD+ models rolled out more multifacetedly than expected, including because

subnational jurisdictions gained importance (e.g., Fishbein and Lee, 2015). Finally, REDD+ action generally lagged expectations by moving only hesitantly from local to jurisdictional-scale actions (Sills et al., 2014; Duchelle et al., 2019).

Two points stand out in this condensed conceptual history of REDD+. First, academic thinking and research actually played an important role in giving birth to REDD+ and its predecessor acronyms. REDD+ development went hand in hand with a quest for incentive-based models of conditional forest conservation, such as PES and forest certification, where local land users would be compensated proportionally to their accomplishments.

Second, parallel to the REDD+ term—understood directly as the objective of reducing emissions from deforestation and forest degradation (by whatever means)—REDD+ was also seen prescriptively as a particular advocated model of conditional conservation with a multilevel PES architecture.

EXPLORING EMPIRICAL CHARACTERISTICS OF LOCAL REDD INITIATIVES

In this section, we will scrutinize different empirical characteristics of REDD+ projects, with a view to the on-the-ground implementation models sketched in the previous section: are there project clusters emerging around key structures

TABLE 1 | REDD+ project types in the 2018 ID-RECCO database, by implementer typology and activity focus.

Activity focus implementer type	Predominantly conservation/ REDD	Predominantly A/R	Total
NGO/ private not-for-profit	47.3%	37.3%	42.7%
Private for-profit	24.6%	50.2%	36.4%
Public	28.1%	12.4%	20.9%
Total %	100.0%	99.9%	100.0%
Total	226	241	467

A/R, Afforestation/ reforestation.
Source: ID-RECCO database (Simonet et al., 2018a).

of context or design? And, to what extent can we link the *de facto* adoption of REDD+ models to different implementation contexts (our second research question)?

For this exploratory purpose, we use the aforementioned ID-RECCO database, containing data on 467 projects and programs in 57 countries (Simonet et al., 2018a). We want to look at projects featuring the original primary goal of avoided deforestation and forest degradation (i.e., REDD without the "+" sign). Selecting only projects and programs with this primary goal screens out more than half of the ID-RECCO projects: only 226 projects have an either full or predominant focus on avoided deforestation and degradation (48.4%)[4]. The others focus instead on afforestation/ reforestation (A/R) activities (the "plus" element of REDD+), i.e., absorbing carbon instead of preventing emissions. Their economic rationale also differs: just like in past CDM projects, asset-building investments, such as tree planting dominate; in contrast, conservation-focused REDD+ interventions are activity-reducing, so that "the costs of inaction," i.e., the opportunity costs of limiting landowner activities, dominate. To steer free of this functional divide, we concentrated only on REDD projects proper—i.e., without the "plus" from here onwards (**Table 1**).

Figure 2 shows a principal component analysis (PCA) (Jolliffe, 2002) of these 226 projects and programs in ID-RECCO, notably including programs that take a jurisdictional approach as defined in this Special Issue.

Not surprisingly, about a dozen jurisdictional REDD programs (left-hand side of figure) formed a distinct cluster of their own, compared to the REDD project cluster (right-hand side), with still wide variation within clusters in the 2nd plotted dimension (y axis)[5]. Loadings of the two dimensions (1st dim = 13.8%, 2nd dim = 12.1%) also underline the significant difference between jurisdictional and project-level REDD: beyond the trivial factors of larger size, more recent start-up and still ongoing, jurisdictional REDD programs are also less linked to protected area

management, have lower incidence of local direct payments, and are less likely to be certified. A qualitative analysis of the underlying data also shows that jurisdictional programs tend to have more overall objectives, in keeping with their more holistic nature.

However, zooming in on the six jurisdictional REDD+ programs in the GCS REDD database also reveals that their clustering in **Figure 2** is not uniform: the three Brazilian cases (Cotriguaçu, Acre, and São Felix do Xingu) cluster together with the newer jurisdictional programs (left-hand side), whereas the two Indonesian (Berau, Ulu Masen) and the Vietnamese case (Cat Tien) cluster together with the traditional REDD projects on the right-hand side—at least when using the above specified variables in the PCA analysis. This may serve us as a note of caution that moving to administrative units and jurisdictional boundaries may eventually achieve a more holistic approach (e.g., involving more stakeholders and land uses), but might not *per se* immediately change all structural characteristics of the implied interventions.
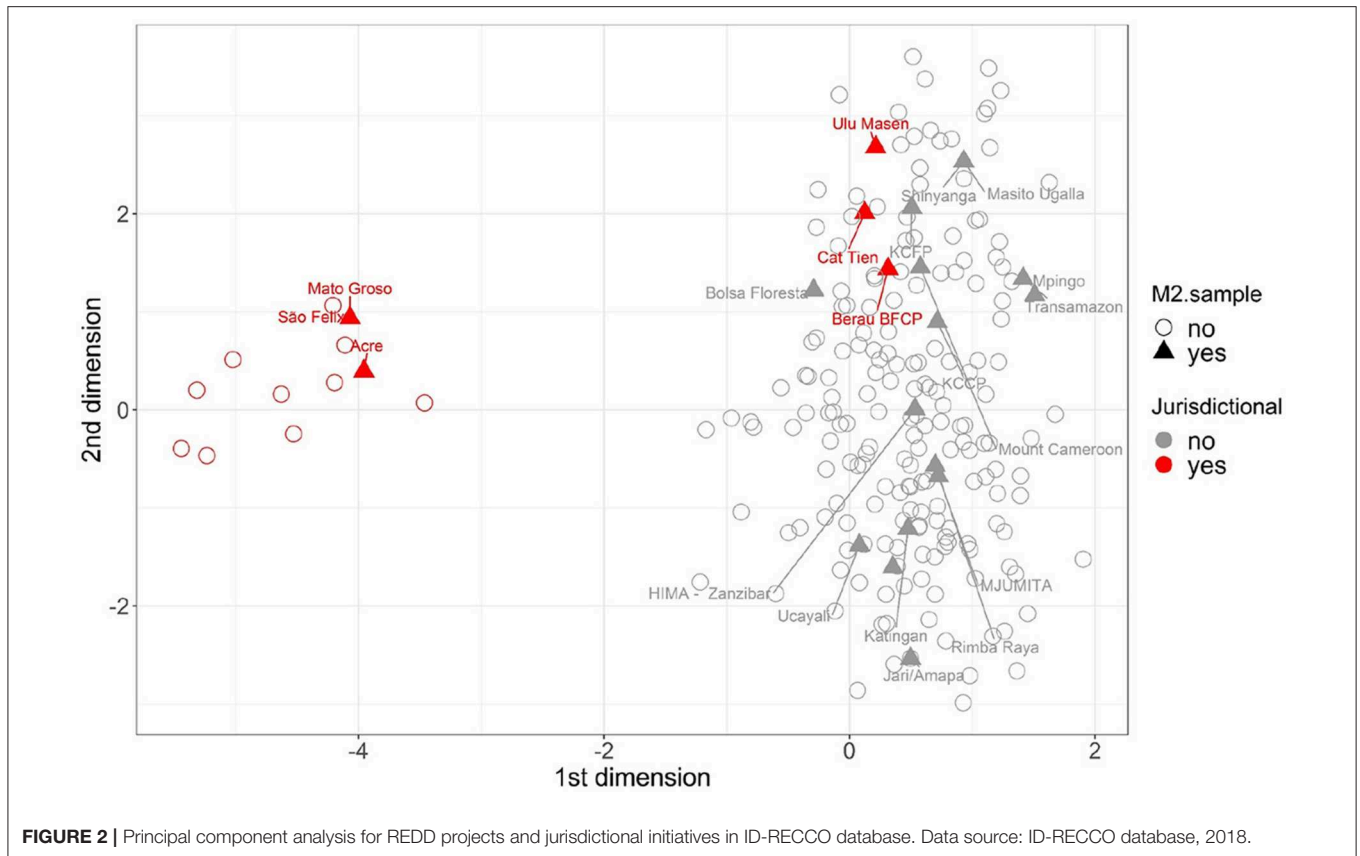
Having noted this line of division in the full sample, we now turn to a more detailed analysis of the much larger right-hand side PCA cluster, comprised of 214 REDD projects (including three former projects that are now jurisdictional initiatives). Similarly to Ezzine-de-Blas et al. (2016), we found in the permutational homogeneity of dispersion plot presented in **Figure 3** a marked sample clustering tendency toward the three types of project implementers: NGO/ private not-for-profit, private for-profit, and public implementers. While there are overlaps between the clusters, the mass of projects cluster well around their three respective centers.

We can thus juxtapose the Euclidean distance between the respective implementer-class centers with the loadings plot for the two PCA dimensions, in order to decode in what way the three clusters differ, recognizing intuitive patterns: NGO-led REDD projects tend to be smaller, more linked to protected areas and to be certified, while relatively fewer of them plan for conditional cash payments[6] to local landowners. Private for-profits tend to have fewer project objectives than public or NGO-led ones, as one might expect in commercially oriented initiatives. Public initiatives— the most likely to have common ground with evolving JA—tend to be of a larger size, are less often linked to protected areas and, interestingly for our purposes, are more inclined to plan for conditional incentives than private or NGO initiatives. Noteworthy is also the significantly different dispersion within groups ($F = 4.84$, $P < 0.003$). A pairwise comparison confirms a significant wider dispersion of the NGO and the public groups, in comparison to the private for-profit group. This arguably reflects the narrower

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[4]Criteria here include project implementers' self-denomination as A/R vs REDD, as well as the activity distribution of budgets, hectares, and/or beneficiaries.
[5]We retained the scores of the first two dimensions of the PCA, as only these accounted for at least 10% of the variation.

[6]Unfortunately, the ID-RECCO database did not separate out plans for in-kind conditional transfers. However, as we know from PES cross-section studies, cash transfers are the clearly dominating vehicle for imposing local-level conditionality (Ezzine-de-Blas et al., 2016).

FIGURE 2 | Principal component analysis for REDD projects and jurisdictional initiatives in ID-RECCO database. Data source: ID-RECCO database, 2018.

size and scope of for-profit projects, compared to a wider range of project origins and objectives, in particular in the NGO group.

MULTILEVEL CONDITIONALITY IN REDD DESIGN?

To what extent, then, were conditionality principles applied in the architecture of early REDD projects, specifically vis-à-vis our second research question? Scrutinizing the ID-RECCO database (2016 and 2018 versions), we explore the relationship among three factors:

- Certification by either the Verified Carbon Standard (VCS) or the Climate, Community, and Biodiversity (CCB) standards, as pre-steps to market entry;
- Planned and actual carbon sales, respectively (on voluntary markets, or bilateral transactions), and
- Planned use of conditional incentives vis-à-vis on-the-ground land stewards.

Figure 4 shows that the number of ID-RECCO registered REDD projects, whether ongoing or ended, rose between 2016 and 2018 from 204 to 226, i.e., by 10.8%. The number of projects that were certified (or in the process of becoming certified), either through VCS or CCB, only rose marginally, from 94 (46% of total) to

96 projects (42%). In 2016, 133 projects, or almost two thirds of the total, planned to sell carbon—including the vast majority (82) of the certified ones. Yet, only 47 projects (23%) had already sold carbon credits in 2016; 91% of these were certified. This panorama shifted somewhat in 2018. Markedly more projects, 66 (29%), had now sold carbon credits, 88% of which were certified; the number of non-certified carbon sales also jumped from 4 to 8 cases. But the amount and share of projects still planning to sell carbon dropped markedly, from the previous 133 (65%) to 112 (49%).

The implication of this marked clustering trend seems to be that certification was a necessary, yet not sufficient precondition for intentions, and especially *de facto* success in selling carbon. Certification and actual sales of carbon credits were strongly correlated (for 2018: $R^2 = 0.35$, $t = 10.9$, $p < 0.001$). While the certification of REDD projects as a process had already reached its climax in 2016, the diversification process of would-be sellers advanced further: more projects reached their carbon-sale goal by 2018—mostly within, but some also outside the marketplace. Yet, even more projects dropped their earlier intentions to sell carbon. We might conjecture that increasingly faint carbon market prospects overwhelmed these projects.

What about the corresponding supply-side design, i.e., paying people on the ground? **Figure 5** simplifies the distribution in **Figure 4** and relates it to plans for conditional and non-conditional on-the-ground payments in 2016 and 2018,
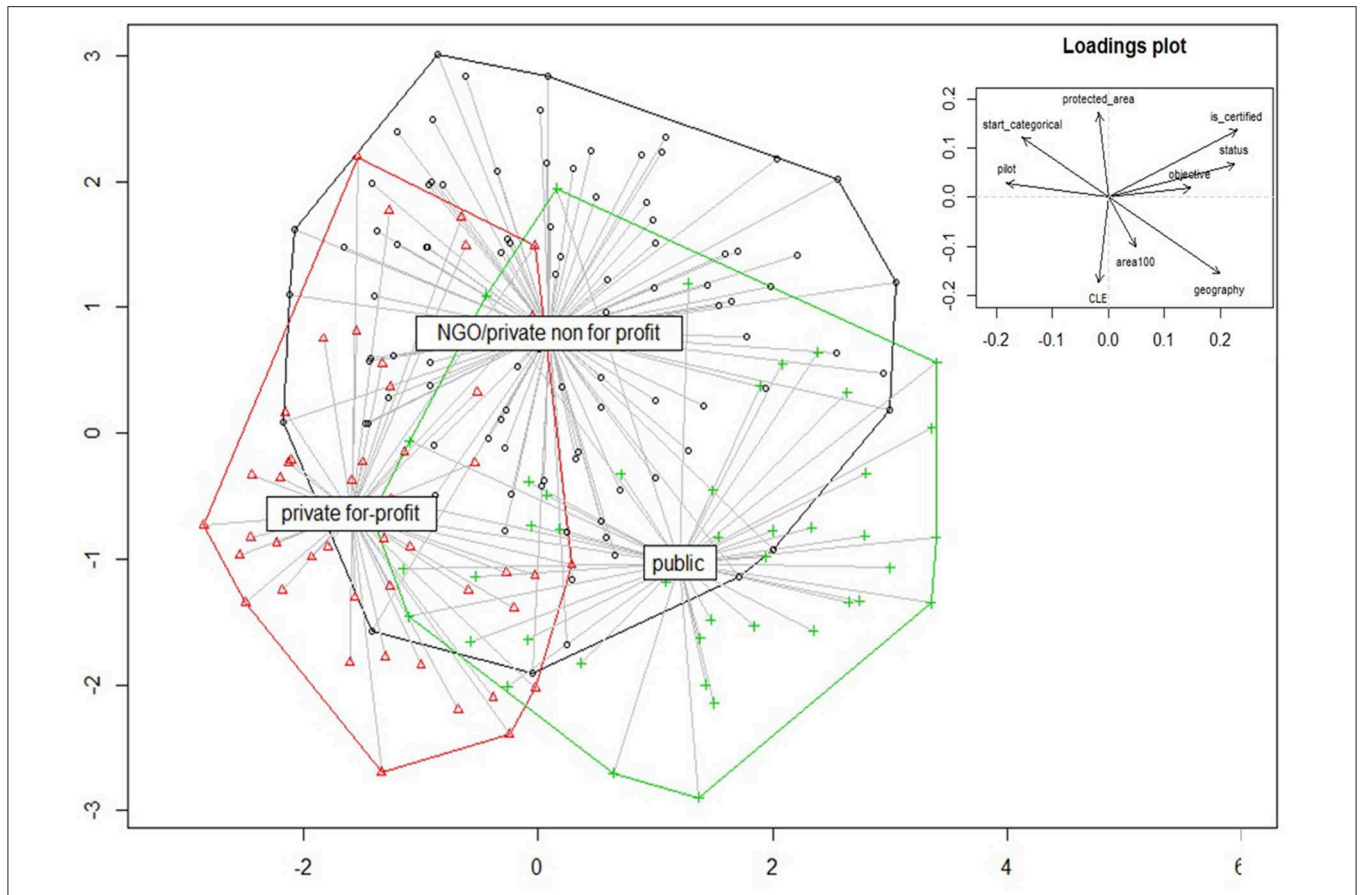
FIGURE 3 | Principal component analysis for REDD projects, excluding jurisdictional initiatives: multivariate homogeneity of group dispersions (variances) by implementer type. Data source: ID-RECCO database, 2018.
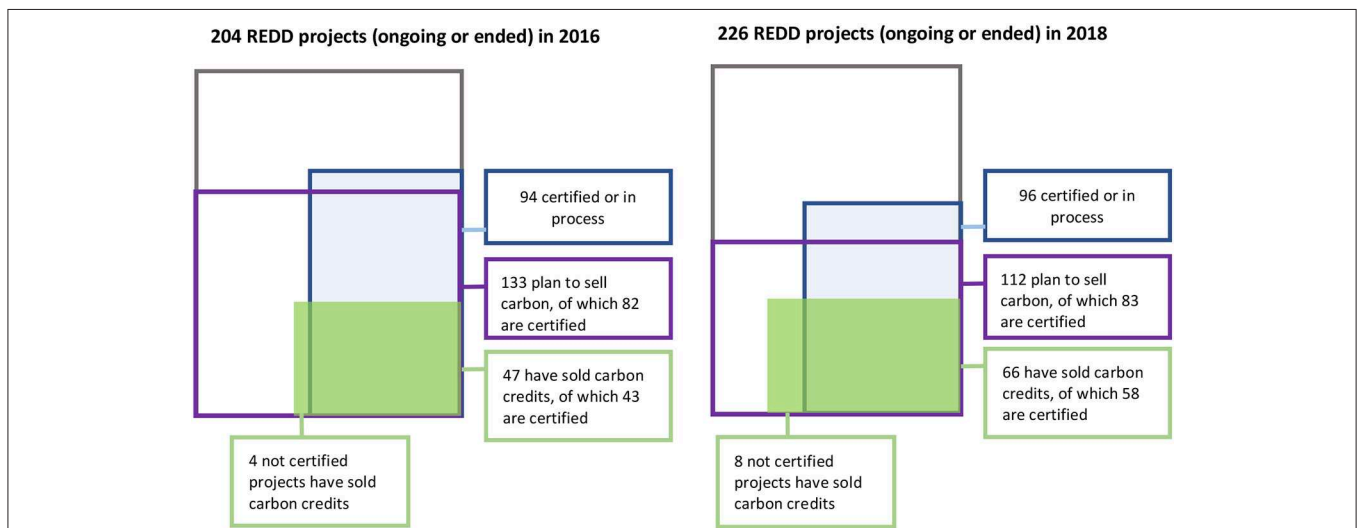
FIGURE 4 | Certification, willingness and ability of REDD projects to sell carbon credits: status in 2016 and 2018 compared. Numbers for each category are symbolized by the area of their relative rectangles, allowing for intersection between the different conditions (e.g., not all projects seeking certification are also seeking carbon sales, while not all projects selling carbon are certified).

FIGURE 5 | Certification, carbon sales and types of incentive payments planned in REDD projects: status in 2016 and 2018 compared.
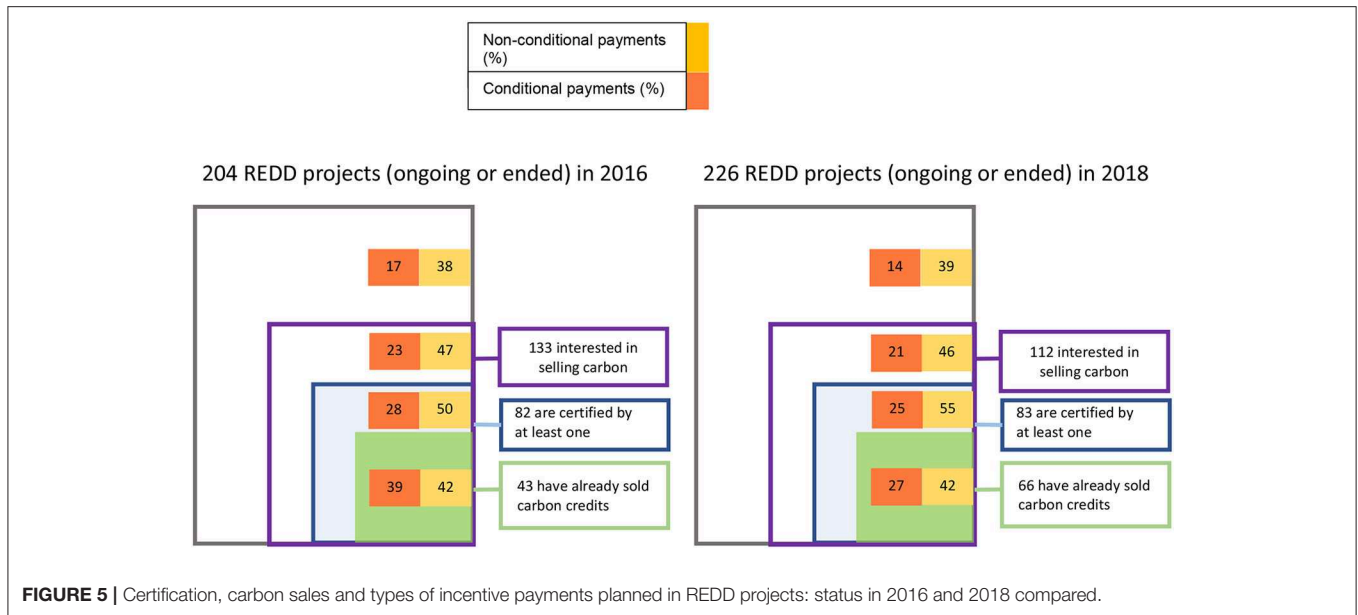
respectively. Non-conditional incentives (orange-colored) were in 2016 only foreseen in 17% of the 204 REDD projects, but this share rises continuously as we move toward the inner core of closer carbon-sale involvement, i.e., interest in sales (23%), certification (28%) and actual sales (39%). For 2018, the picture is similar, but the progression is less accentuated (21, 25, and 27%). Thus, the relationship is similar in 2016 and 2018, but starts at a much higher level in 2018, when 39% of all projects planned conditional local payments. Furthermore, the progression continues just until the point of certification (55% planned conditional payments), while projects with actual carbon transactions were less likely to be planning conditional payments to local land stewards (42%).

Notably, many REDD projects thus followed the theoretical conceptualization sketched in section From Compensated Reduction Toward a REDD+ Model, by planning more for conditional than non-conditional local incentives. Both payment types became more popular among projects more involved with carbon markets. This intuitively makes good sense: the more likely projects were to count on sustainable carbon incomes, the more inclined they were to commit to continuous local payment contracts. However, this correlation between intention to employ conditional payments to local land stewards and intention to sell carbon credits holds only through the certification stage. We speculate that this is because an equitably designed local benefit-sharing mechanism has had particular importance for project chances of getting certified, because it helps demonstrate commitment to social safeguards.

This key role of certification is also confirmed in our multivariate analysis of whether or not projects were planning conditional local payments, using the project descriptors from the PCA analysis in section Exploring Empirical Characteristics of Local REDD Initiatives as explanatory variables in a multiple

linear regression model (**Table 2**). As we can see, in this model, whether projects were certified or not has one of the largest estimated coefficients, and the only one significant at the 1% level, as predictor for local payment plans. Additionally, we note slight geographical differences, with projects in Asia and Latin America (both significant only at 10% level) less likely to plan conditional payments at the local level compared to projects in Africa—perhaps somewhat surprisingly so, since for watershed PES at least Africa was found to lag behind these continents in implementation (Ferraro, 2009). Finally, early-bird projects (begun before 2006) were significantly less inclined to plan for conditional payments (significant at 5% level). This makes good intuitive sense, since projects later transforming into REDD would in their original setup have been unaffected by the compensated-reduction currents that spread in the wake of the 2007 UNFCCC Conference in Bali.

A CLOSER LOOK AT IMPLEMENTATION OF REDD+ PROJECTS

Implementer Perspectives

In the quest to discern patterns of interventions used in actual REDD project implementation, we use CIFOR's GCS REDD+ database of 23 REDD projects in six countries (Brazil, Peru, Cameroon, Tanzania, Indonesia, and Vietnam) with two data points (2010/2011 and 2013/2014) available for all but one initiative (Bolsa Floresta) (**Figure 6**). In the PCA in **Figure 2**, the scores of the GCS sample (marked as triangles) appear randomly scattered, thus not pointing *a priori* to a biased sample vis-à-vis the ID-RECCO data. Furthermore, a general comparison has confirmed that the GCS sample can be considered a reasonable if imperfect subsample of the wider universe of REDD projects as represented in the ID-RECCO database (Sunderlin et al., 2016, p. 145–154). Our specific interest is in the (potential and actual)

TABLE 2 | To pay or not to pay conditionally: REDD project plans for local implementation.

	Estimate	Std. error	z-value	Pr(>|z|)
(Intercept)	−0.14	0.54	−0.26	0.792
In Asia	−0.88	0.44	−1.98	0.047**
In Oceania	−0.17	1.62	−0.02	0.991
In South America	−0.76	0.42	−1.81	0.0695*
Protected area included (y/n)	−0.24	0.35	−0.70	0.483
Pilot project (y/n)	0.10	0.36	0.26	0.792
Planned project (y/n)	0.06	0.63	0.11	0.913
Ongoing project (y/n)	−0.11	0.42	−0.24	0.807
Certified (y/n)	1.18	0.40	2.96	0.003***
Project start pre-2006 (y/n)	−1.84	0.85	−2.18	0.029**
Project area	−0.01	<0.01	−0.25	0.797

Regression coefficients for a general linear model on the 2018 data.

Binary response variable: "Does the project plan to make land- or resource-use specific conditional cash payments to local land stewards (households, communities, etc.)? yes = 1/no = 0.

Significance levels of explanatory variables: 10%*, 5%**, and 1%***.

Source: ID-RECCO database (Simonet et al., 2018a).

application of conditional on-the-ground incentives, as a key part of the vision of REDD as a multi-level PES scheme (cf. section From Compensated Reduction Toward a REDD+ Model).

The GCS research protocol included detailed interviews with implementers. In these interviews, 18 of the 23 implementers stated that they either planned to, or had already begun to use conditional payments to households or communities, or other conditional (cash or in-kind) livelihood enhancements, while the remaining five had ruled out this instrument (Sunderlin et al., 2014)[7].

Most projects and programs in the GCS sample used highly diversified interventions, thus resembling integrated conservation and development projects (ICDP) (Sunderlin et al., 2014)[8]. When implementers were asked to internally compare conditional incentives to other instruments in their complex intervention mix, conditional incentives were singled out as the potentially most promising intervention of all, and also as the one with which they were most satisfied when evaluating project outcomes so far. However, two key obstacles were also cited in the interviews. First, insecure land tenure and overlapping land claims often made it impossible for the implementers to contract with land users in ways that also could secure desired REDD outcomes. Second, implementers were reluctant to promise continuous incentives to local people

given current shortages of REDD funding, and large insecurities about future funding flows: with multi-year contracts clearly came a set of mutual expectations for continuous responsibilities. Consequently, some project managers also saw conditional incentives as more experimental in nature: only nine, or half of the (actual or potential) 18 implementers of conditional incentives also believed that these tools would in the future come to constitute their single-most important land-use management instrument to reduce carbon emissions (Sunderlin et al., 2014).

Household Perspectives

We can zoom in further to examine the "incidence" of different types of interventions within project boundaries, or how many households were affected by different types of REDD interventions in the villages in the intervention areas of projects in each country[9]. In **Figure 7**, we can read the household-reported "intervention counts" as a crude measure of the treatment intensity (or "score") for different types of interventions.

The last, right-hand side column gives us the global total of counted interventions, and their relative distribution. Conditional incentives score around 10%, or about the same as forest enhancements and environmental education. Yet, this constitutes only half the score of the command-and-control category "restrictions on forest access & conversion," and only about one third of the non-conditional incentive category. That said, the geographical variation is large: in Vietnam, Tanzania, and Cameroon, the score for conditional incentives approaches one fourth to one third (in the former two cases, exceeding the non-conditional category)—although precisely in those countries, the share of eventually abandoned REDD projects was also large, implying that payments may in some cases have been short-lived. In Brazil and Indonesia, the share of conditional incentives is well below 10%; in Peru, it is zero.

We might see this aggregate imbalance in implementation toward non-conditional incentives as particularly surprising: section Multilevel Conditionality in REDD Design? had clearly shown us from the ID-RECCO data a converse bias toward conditional incentives in project plans. However, many conditional payment schemes were introduced as pilots only in a few villages, and did not gain much traction in terms of the overall impact on all households.

What were the impacts of the different types of interventions (or instruments) as perceived by the involved households? **Figure 8** gives us a picture from the GCS REDD household survey questions about perceived effects on both land use and well-being. In other words, households were asked to what extent they thought a certain intervention had affected their natural resource management decisions, and likewise vis-à-vis their household welfare—and, in which direction.

Starting with the land use/environmental side (**Figure 8A**), the household-perceived effectiveness of any given instrument in changing land- and resource-use decisions was on average 35.9% (bottom corner). Forest enhancements topped the ranked list

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[7]This number was 50% higher than the 12 planning cash payments registered in the ID-RECCO desk-based dataset for the same projects (Simonet et al., 2018a). The large difference is likely due to two factors. First, ID-RECCO data refer only to cash payments, not other conditional instruments. In GCS projects in Indonesia, for instance, some REDD+ support for rubber cultivation and chicken raising was contingent upon villages complying with annual goals for deforestation reduction agreed between the implementers and the communities (Duchelle et al., 2017). Second, the direct GCS interviews with implementers elicited more detailed information, especially about future plans that may not have been fully formalized in project development documents or certification reports.

[8]See Sunderlin et al. (2016) for detailed descriptions of intervention types.

[9]This household analysis draws on 17 of the 23 GCS sites where household surveys were conducted.
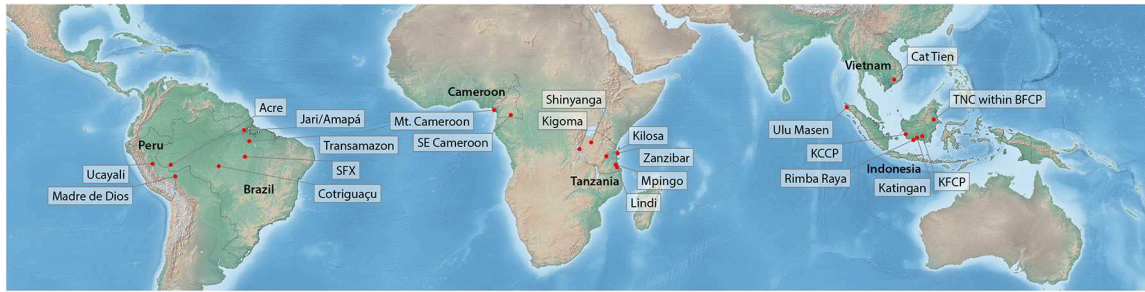
FIGURE 6 | CIFOR's 23 subnational GCS-REDD sites. Source: GCS database, CIFOR.
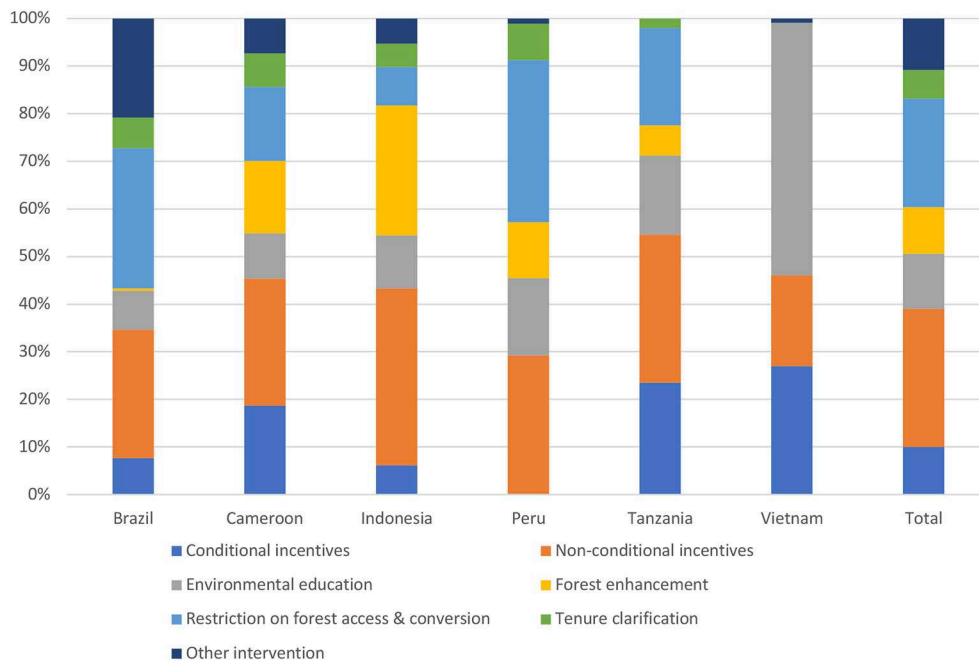
FIGURE 7 | Household-reported involvement in tools of subnational REDD+ interventions. Includes only cases where the household is actually involved in the intervention ("involved" = "yes"). Source: GCS-REDD M2 data, household surveys, 2013–2014.

(59%), followed by access and conversion restrictions (42.8%). Third are conditional incentives (39.8%), exceeding *inter alia* non-conditional incentives (28.5%).

Looking at the perceived household well-being effects (**Figure 8B**), we note initially that in fact all interventions had a net positive balance—i.e., the aggregate positive ("positive" plus "very positive") exceeded the aggregate negative ("negative" plus "very negative"). For a close-up view, the ranking of "positive" and "very positive" impacts combined was led by forest enhancements (70.7%), followed closely by conditional incentives and environmental education (both 63.2%), non-conditional incentives (57.9%), and land-tenure clarification (57%). Hence, conditional incentives held the second-highest net positive rate of all interventions, but not by a wide margin.

Yet, this crude instrument ranking alone says little about the total welfare impacts of these REDD projects, especially whenever disincentive elements came to dominate the portfolios of interventions. Duchelle et al. (2017) find for the same GCS sample that households exposed to disincentives alone suffered a decrease in perceived tenure security and in their overall perceived well-being; adding incentives into the intervention mix helped to alleviate these negative effects on well-being.

CONCLUSIONS AND PERSPECTIVES FOR JURISDICTIONAL APPROACHES

REDD Project Components: Plans and Implementation Patterns

Above we examined how REDD+ was originally conceptualized, emerging from the concept of compensated reductions in deforestation, and developing toward an envisaged multitier
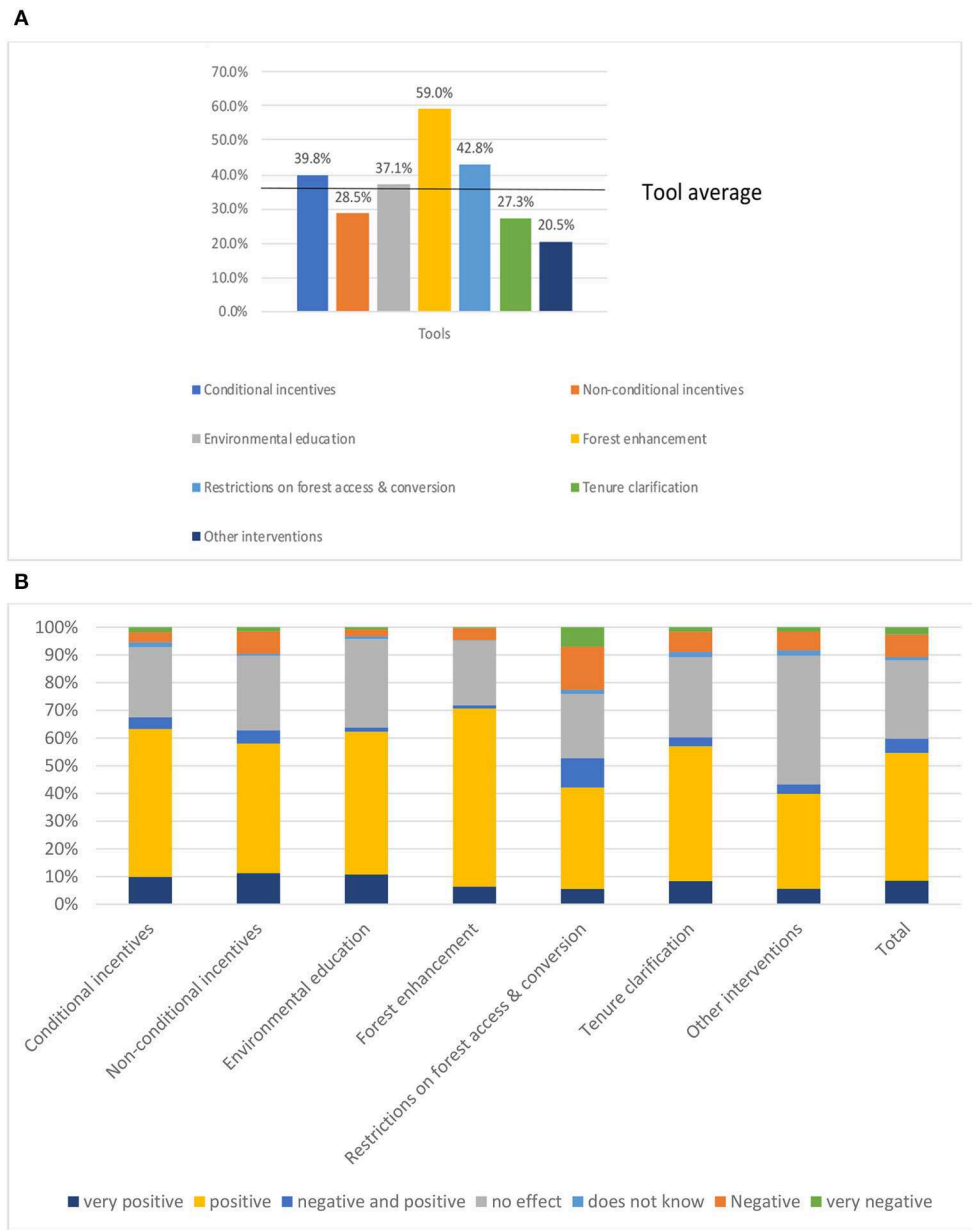
FIGURE 8 | Household-reported REDD+ partial tool impacts on land use and well-being: did the treatment component affect households? **(A)** Land use. **(B)** Well-being. Includes only cases where the household is actually involved in the intervention ("involved" = "yes"). Source: GCS-REDD M2 data, household surveys, 2013–2014.

scheme of international payments for environmental services (PES) that aimed to capitalize on the promise of enhanced effectiveness of conditionality. Using the ID-RECCO database, we analyzed the design of 226 conservation-oriented REDD projects, comparing the empirical pattern of planned project components to the theoretical conceptualization of REDD+. From the PCA, we identified three well-defined clusters: public, private-commercial and NGO-type of REDD initiatives. One hundred twelve of these where planning to sell carbon from the outset, but by 2018 only 66 had succeeded. Most of those were certified by at least one standard. Actual or planned

conditional payments to landowners, the key feature of PES, were registered for 88 projects. Geographic region, certification and post-2006 project starts are the only statistically significant covariates explaining plans for conditional incentives. This points to the importance of REDD+ benefit sharing mechanisms for certification.

We thus identified an empirical nexus between project carbon sales, certification, and PES payments: the three factors seem to positively reinforce each other. As a next step, we zoomed closer in to the 23 projects CIFOR's GCS REDD data (six of them either began as or later converted into

jurisdictional REDD+ programs), drawing on both implementer and household surveys. This databased reveals that some projects originally planning to use PES mechanisms failed to do so in the end; others piloted payments only in tiny subareas (e.g., single villages), thus exhibiting overall low treatment intensities.

On aggregate, we can in the GCS sample distinguish three different types of local REDD experiences with conditional payments[10]. The first category refers to trial-like, short-term pilot payments, done either in about half of the project villages (the Tanzanian cases of Shinyanga, Kigoma, Lindi, Kilosa), with the rest being even more punctual (Zanzibar, Berau—Indonesia). Some payments here were just conditional upon villages adopting sustainable land-use plans, not (yet) on monitored land-use compliance. Conditionality on land-use compliance was often spurred by donors (e.g., NICFI, DFID). In some cases, these donors actively persuaded the implementer[11], to try out conditional payments to learn more about benefit-sharing mechanisms, rather than to primarily test the environmental effectiveness.

Second, the conditional payments in SE Cameroon and the Transamazon were longer-term experiments with well-conceptualized, systematic PES components, and with a clear interest in conservation effectiveness. Yet, they remained small-scale and in early-stage development, before eventually being abandoned. For the Cameroonian project, there was at least a plan to make the funding flow for PES sustainable (Plan Vivo certification), while the Transamazon project relied on time-limited funding from the Amazon Fund.

Finally, both the Brazilian initiatives of Acre's SISA program (which became the world's first jurisdictional REDD+ program) and the Bolsa Floresta program (Amazonas), with their large-scale public-sector involvement, had a different nature, with larger treatment intensity: higher percentages of households were/ are being covered over multiyear periods. However, both programs applied PES in complex policy mixes together with command-and-control and ICDP type of interventions. For Acre and especially Bolsa Floresta, the funding models generally draw on a diversity of sources, and appear more consolidated than for any other GCS initiatives. In both of these cases, monitoring systems for the land-use conditions underlying PES contracts are in place, and have been tested, although sanctioning of non-compliant recipients rarely occurs.

Interestingly, among the GCS REDD implementers, we found support for the promise of conditionality's effectiveness. Somewhat surprisingly perhaps, project implementers reported conditional incentives as being both the potentially most promising, and so far also de facto most effective land-use management tool, whenever this tool could actually be applied. For REDD-treated households, the situation is similar: they identified conditional incentives as comparatively effective in

changing their land-use plans, while also providing above-average welfare returns to households.

In spite of this apparent popularity on both the implementer and recipient ends, conditional incentives remained underutilized in REDD implementation, registering only one-third of the treatment intensity of non-conditional incentives, clearly the implementation instrument most often employed. Only nine out of 23 (39%) project implementers believed that conditional incentives could become their single-most important tool, citing its two perceived key restrictions: first, insecure land tenure impeding effective contracting of land stewards, and second, the insecurity in financial flows for REDD+ jeopardizing longer-term contractual arrangements. There is an understandable fear among implementers to raise, and later frustrate expectations when PES can only be sustained in the short-term, as recipients build expectations for a continued delivery of subsidies.

Returning to our two research questions from section Introduction, we can thus first conclude that the original vision of a multitier PES model for REDD was significantly transformed when implemented in forested developing countries. Command-and-control policies and non-conditional incentives came to play a much larger role than PES. Implementation of conditional payments ran into both a supply- and a demand-side problem, which jointly seems to explain the discrepancy between REDD theory and practice. This outcome was predicted by literature on PES that identified secure tenure and secure funding flows as key preconditions for PES implementation in general (Wunder, 2013; Engel, 2016), as leading to failure of PES in specific cases lacking those preconditions (Wunder et al., 2008), and as caveats for using conditional landowner payments in REDD+ strategies (Wunder, 2009; Pagiola, 2011). In the murky waters of forest frontier governance and irregular funding flows, REDD+ practices thus mutated into a heterogeneous mix of opportunistically customized interventions.

Secondly, we asked what factors favor adoption of a multitier PES model. The answers clearly mirror the observed problems identified in response to the first research question: projects with clear and secure land tenure situations, with long-term financing sources, and with carbon market certification and sales are generally be more likely to adopt (and be able to stick to) conditional incentive payments to landowners. Only in a small subset of scenarios were those conditions satisfied. These institutionally and financially demanding requirements for conditional incentives constitute a lesson from our analysis that goes beyond REDD+ and JA.

Perspectives for Jurisdictional Approaches to REDD and Low Emissions Development

Clearly jurisdictional approaches to REDD+ and low emissions development intend to take a giant step forward vis-à-vis REDD projects, *inter alia* by being more holistic in actions, more policy-integrated, and operating at larger scale. There is sound evidence that national (and subnational) policies are more important than local projects in reducing deforestation, although these national policies are typically

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[10]This classification draws on the case description in Sills et al. (2014) and the GCS database.

[11]In the case of the Transamazon project (Brazil), for instance, the Amazon Fund played a key role in persuading the implementer (the NGO IPAM) to engage in a PES scheme, as part of the REDD+ project (Erika P.P. Pinto, pers.comm., April 2015).

also shaped by social priorities—such as national income, employment, or price stability (e.g., Angelsen and Kaimowitz, 1999, Busch and Ferretti-Gallon, 2017). Nonetheless, REDD projects remain arguably one of their "closest relatives," and family ties are hard to completely escape: the opportunities and problems revealed by attempts to implement the REDD+ model are likely to re-appear in efforts to implement the JA model.

For instance, jurisdictional REDD+ programs have so far also received only hesitant and slow climate financing flows, making it difficult to plan for the future. Just as for REDD projects, these financial flows have been coming mostly in non-conditional forms, rather than being based on performance. The major struggles for jurisdictional initiatives against forest loss also occur typically at the same forest margins/ agricultural frontiers, characterized notoriously by deficient institutions—and the same land-tenure insecurities that REDD has been exposed to. While JA at higher implementation scales are closer to the policy-making, they will also have to balance more concerns. However, many key implementation bottlenecks of JA and REDD are likely to be quite similar. Jurisdictions would seem well-advised to only rely significantly on conditional landowner incentives in scenarios where the preconditions for PES are met.

Yet, jurisdictional programs also share with REDD projects an urgent strategic necessity: to develop effective and cost-efficient incentives for local stakeholders including landowners, so as to balance the typically negative effects of government-led command-and-control policies (Duchelle et al., 2017). This is a key shared challenge in making local allies favor a forest conservation agenda. Currently, in many tropical forest frontiers, this challenge has not been well-addressed: the incentives remain insufficient and/ or ineffective.

On the positive side, the results above imply that, whenever the right preconditions exist, or can be created, land-use conditional incentives can be an important component in complex policy mixes. The sample features cases where conditional incentives were applied quite successfully with respect to environmental impacts (e.g., Simonet et al., 2018b). The use of conditional incentives was endorsed as both well-performing and promising by project implementers and households alike. Whereas non-conditional, ICDP-like incentives typically need to be customized to regions, villages, or even individual landowners, conditional incentives can arguably better be applied on larger scales—such as in the Brazilian cases of Acre (SISA) and Amazonas states (Bolsa Floresta): conditional incentives may also provide a pathway of keeping transaction costs at bay.

Hence, jurisdictional REDD+ programs should not shy away from these opportunities. However, once larger-scale incentives schemes have been adopted, close attention needs to be paid to the design of such initiatives: many large-scale public-sector PES schemes tend to adopt multiple side-objectives in conflictive ways that typically reduce, sometimes dramatically, their environmental efficiency (Engel, 2016; Wunder et al., 2018). Since landscape approach interventions in general and JA in specific are multi-objective and holistic by design, they will have to carefully consider tradeoffs between objectives.

Conversely, what alternative incentives could be used in JA and other upscaled initiatives in lieu of large-scale performance-based PES schemes, whenever the conditions are not apt for these output-based distribution systems, such as carbon credits? A series of incentives may still be possible, such as rewards for certain discrete management activities (input-based rewards) or as governance support for the implementation of jurisdictional anti-deforestation policies, such as tax distributions systems that reward states or municipalities for the size and/or quality of their protected area management (e.g., Ring, 2008).

More broadly, should we expect JA implementers to be more at ease with policy influence than REDD practitioners? de Sassi et al. (2014, p. 426–428) and Ravikumar et al. (2015) both compared the perceptions among jurisdictional and project implementers at the 23 GCS sites. de Sassi et al. found no support for the *ex ante* hypothesis that subnational policies would be perceived as less challenging by JA implementers than by project proponents. Specifically, jurisdictional approaches were found to suffer from the swing of the pendulum from pro-climate mitigation to anti-mitigation policies. Having multiple stakeholders in a jurisdictional approach thus required "navigating conflict and collaboration among actors with very different interests and degrees of power" (de Sassi et al., 2014, p. 428). "Multilevel governance challenges were not automatically resolved" [by JA implementation] (Ravikumar et al., 2015, p. 931); instead the success of subnational jurisdictional programs would become highly context-specific, depending specifically on political negotiations in the jurisdiction vis-à-vis the nexus of agricultural, investment, and trade-related policies (Ravikumar et al., 2015, Figure 1).

In sum, probably most new policy initiatives will produce some unexpected obstacles to implementation when they hit the ground – in the face of which active learning from previous, even remotely similar types of policy implementation can become a strong asset.

Conceptual Development Patterns

Finally, we see interesting parallels between REDD and JA in the historical process of conceptualization: compensated reductions and RED were originally coined as mere objectives, yet quickly morphed into a dominant REDD+ model of multitier conditional payments—thought at the time to be the most logical, politically implementable, and ethically desirable architecture—yet arguably also underestimating along the way some key preconditional obstacles. As shown above, the reality of REDD+ implementation came to look quite different from the dominant expectations.

Similarly, today JA corresponds to the objective of taking emission reductions to higher scales where carbon leakage is reduced, policy synergies can be better exploited, and cost efficiency likely be boosted. The currently used definitions of JA belong to the family of descriptive, deliberately vague definitions that can be advantageous at early stages of conceptual development (Strunz, 2012). However, it arguably also contains strong prescriptive elements (multi-stakeholder, multi-sectoral, landscape-level, policy-market coordination, holistic action) that JA proponents believe to best address experiences with REDD+,

while also being in line with current political winds (e.g., NDC implementation).

In other words, beyond merely constituting a new objective, JA is being framed as a new paradigm or model, in ways that in real time also prescribe how to design and implement emerging interventions. Just as previously REDD+ was conceived as a multitier PES system that never actually pre-existed on any significant scale, JA is arguably based on what its key implementers think should become mainstream implementation: a government-led, multi-stakeholder, integrated public-private, comprehensive approach to forest and land use.

Political science suggests that it is generally not unusual for new ideas to shift the way a policy problem is conceived and discussed, well before (or alternatively without) any actual policy change (Hall, 1993). A genuine policy paradigm shift would thus have taken place only once the objectives and instruments of policy have been replaced by new ones. It is open to question though just how directionally prescriptive the new ideal framing should be—and, conversely, how quickly the old paradigm should be written off.

In our particular case, should a narrowly forest-focused REDD+ approach be dismissed? For instance, a recent impact evaluation confirmed that Norway's NICFI program had indeed had a significantly positive environmental impact on Guyana's forest cover, as compared to a business-as-usual scenario (Roopsind et al., 2019). These REDD+ national-level rigorous impact evaluations are extremely scarce (Duchelle et al., 2019), but could it be that REDD+ can be made to work, after all? Notably, NICFI interventions would qualify as jurisdictional REDD+ programs, but would not necessarily exhibit the full JA suite of hoped-for holistic attributes of being landscape-level, multi-stakeholder, and market-policy integrated. And what if, conversely, the emerging holistic JA paradigm, just like REDD+, also ran into key implementation obstacles—say, in failing to nest actions and credits across jurisdictional sublevels, or in losing a GHG mitigation focus in favor of increasingly vague multi-objective policy mixes—thus eventually calling for the approach to be modified?

In other words, based on the above analysis we argue that JA implementers may be well-advised to not get caught up with a too narrowly framed, pre-conceived conceptual model, which is overly dismissive of the previous paradigm that they seek to improve on. This may help avoid not only exacerbated cycles of "fads, funding, and forgetting" (Redford et al., 2013, p. 437), but also the kind of misaligned functional expectations that arguably came to be generated around the REDD+ model.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Center for International Forestry Research. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

SW formulated the research idea, analyzed data, and wrote the manuscript. CS and GS analyzed data. AD, ES, and WS contributed to the research idea and wrote the manuscript.

FUNDING

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