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Community Participation and Benefits in REDD+: A Review of Initial Outcomes and Lessons

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Abstract: The advent of initiatives to reduce emissions from deforestation and degradation and enhance forest carbon stocks (REDD+) in developing countries has raised much concern regarding impacts on local communities. To inform this debate, we analyze the initial outcomes of those REDD+ projects that systematically report on their socio-economic dimensions. To categorize and compare projects, we develop a participation and benefits framework that considers REDD+'s effects on local populations' opportunities (jobs, income), security (of tenure and ecosystem services), and empowerment (participation in land use and development decisions). We find material benefits, in terms of jobs and income, to be, thus far, modest. On the other hand, we find that many projects are helping populations gain tenure rights. A majority of projects are obtaining local populations' free, prior, and informed consent (FPIC). However, for those projects interacting with multiple populations, extent of participation and effects on forest access are often uneven. Our participation and benefits framework can be a useful tool for identifying the multi-faceted socio-economic impacts of REDD+, which are realized under different timescales. The framework and initial trends reported here can be used to build hypotheses for future REDD+ impact evaluations and contribute to evolving theories of incentive-based environmental policy.

Keywords: REDD+; social impacts; tenure; payments for ecosystem services; deforestation; climate change mitigation

1. Introduction

Initiatives to reduce emissions from deforestation and degradation and enhance forest carbon stocks in developing countries (now commonly termed “REDD+”) have been a contentious issue since their emergence in the late 1990s. The topic of how REDD+ will affect local populations, and which, if any, safeguard policies should be adopted to protect them, continues to be an ongoing source of debate. Millions depend on forest resources for their livelihoods and will be affected by any decision. Some fear that the prospect of forest carbon revenues combined with realities of ambiguous property rights and weak governance in many forest regions may lead states, companies, and even conservation organizations to take actions that threaten rural livelihoods. Concerns about land grabs, evictions, forest access restrictions, and reversals of tenure reforms have all been raised [1,2]. Others argue that because (a) the transfer of REDD+ funds is tied to results and (b) both private and public sector actors are intent on avoiding the reputational risks associated with negative social impacts, REDD+ has greater potential for socio-economic and ecological benefits than previous international forest conservation initiatives [3].

While some policy actors focus on avoiding risks to local populations by adopting safeguards to ensure that REDD+ “does no harm”, others focus on enhancing REDD+’s socio-economic benefits [4]. The rise of REDD+ has sparked renewed hope in the ability of conservation programs to deliver “win-wins” by saving the environment and reducing rural poverty. This is evidenced by the widespread uptake of voluntary certification standards that require forest carbon projects deliver socio-economic “co-benefits”, such as the Climate, Community, and Biodiversity (CCB) and Plan Vivo standards [5–7] and the narratives dominating REDD+ policy discourse (see [8]). Yet both the theoretical and empirical support for the idea of poverty and environment “win-wins” in the context of forest policy is not well established [9], though its logic can be traced to the early “poverty-environment trap” literature—see summaries by Wunder [9], Scherr [10], and Reardon and Vosti [11].

The general theory of poverty-environment traps posits that because the environment is a key input into household production and thus an important “asset” held by the rural poor, environmental destruction increases poverty. And yet because clearing land for agriculture and harvesting natural resources are also the primary livelihood strategies in rural landscapes, the poor’s efforts to lift themselves out of poverty can in fact drive them deeper into poverty—into a “poverty-environment trap”. If this explanation of rural poverty is correct, then interventions encouraging more sustainable use of the landscape might halt this slide and deliver “win-wins”—though note that the “win” on the poverty side is one of poverty *stabilization* and not poverty *reduction*. Barbier [12] has recently articulated a more nuanced theory of poverty-environment traps, which argues that such traps exist only where markets for land, off-farm labor, and credit are incomplete. He identifies policy interventions that correct these market failures as well as payments for ecosystem services as actions that can help the rural poor break out of poverty-environment traps. Barbier and Tesfaw [13] argue that REDD+

may reduce poverty, and thus achieve “win-wins”, in those settings where local populations’ property rights are well-established or where REDD+ initiatives make efforts to enhance their tenure security.

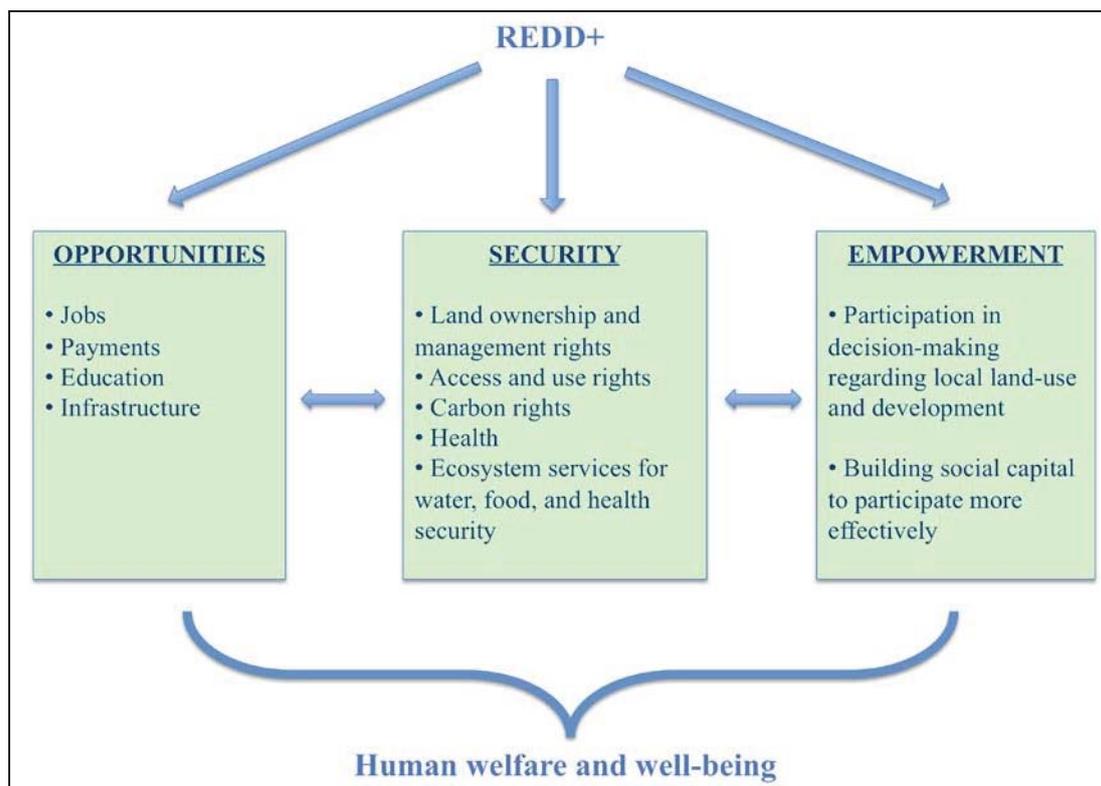
To help inform the policy debate and the design and implementation of future REDD+ initiatives, we take stock of REDD+ projects’ initial socio-economic outcomes by reviewing the results reported in project documents. While the contours of national and international REDD+ programs and financing schemes are still emerging, there are over 300 site-specific REDD+ projects under development across the world [14]. Many of these projects are beginning to produce measurable socio-economic outcomes. An examination of these initial results can offer insight into whether and how REDD+ may involve and benefit local populations.

2. Conceptual Framework

To categorize and compare these reported outcomes, we develop a participation and benefits framework, adapted to the particular context of REDD+ (Figure 1). Our conceptual approach draws from the World Bank’s “attacking poverty” framework [15] and incorporates ideas from recent research on institutions and sustainability. We also draw from debates over the merits and practice of participation in environment and development initiatives. The “attacking poverty” approach is informed by the ideas of Amartya Sen and suggests that well-being can be enhanced via three interacting and complementary pathways: opportunity, security, and empowerment. In the context of REDD+, we conjecture that projects could affect local well-being by:

- (1) creating (or blocking) material opportunities for wealth creation and well-being, such as jobs, revenue streams, infrastructure, and improved educational conditions;
- (2) enhancing (or weakening) populations’ security, including tenure security, food security, livelihood security, and adaptability to climate change; and
- (3) facilitating (or preventing) the empowerment of individuals and communities to participate in decisions affecting local land-use and development.

The second and third aspects of this well-being framework—“security” and “empowerment”—deserve a bit more discussion. In his seminal work *Development as Freedom*, Sen emphasizes the importance of human agency, which leads him to argue that freedom (of voice, choice, and action) is both the ends and means of development [16]. In this view, the freedom to participate in decisions affecting one’s life is understood as both a goal of development, as well as a causal pathway or strategy for reducing poverty and enhancing well-being. He conceptualizes human agency in terms of freedoms, capabilities, and functionings—all of which reinforce each other. Capabilities are substantive freedoms or processes that allow freedom of action, such as freedom from hunger or ability to escape starvation. Functionings are the objectives one wishes to achieve, such as eating. Instrumental freedoms include political freedoms, security, and social and economic opportunities. These instrumental freedoms enhance the capabilities of each person to achieve their functionings.

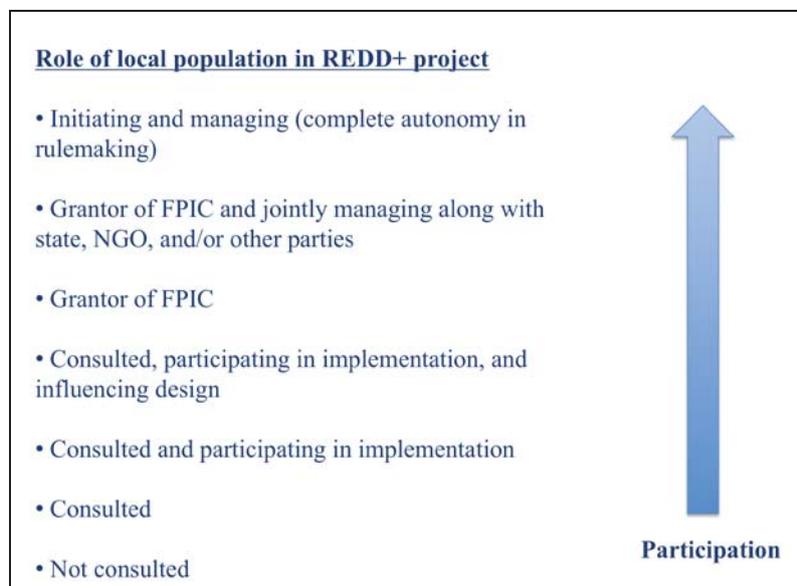
Figure 1. Conceptual framework for characterizing socio-economic outcomes in REDD+.

Sen's emphasis on capabilities and freedom leads him to propose that poverty be thought of as "capability deprivation". This multi-dimensional conception of poverty, along with three other bodies of work outlined below, motivates our conceptualization of both "security" and "empowerment" as key potential socio-economic outcomes of interest in our examination of REDD+ projects.

First, we consider theory and reviews from Ostrom [17,18] on institutions and sustainability and recent empirical International Forestry Resources and Institutions (IFRI) research, which finds that in forest commons, extent of local rulemaking (considering both tenure and autonomy in decision-making) is an important predictor of carbon storage, biodiversity, and sustained forest livelihoods [19,20]. Second, we acknowledge that the topic of "Free, Prior, and Informed Consent" (FPIC) and what constitutes meaningful participation in REDD+ is currently a source of fierce debate in international policy dialogues [21]. Finally, we recognize that the current debate over participation in REDD+ is not new and is instead the current manifestation of a long and continually evolving debate in conservation and development fields. This discourse has evolved from promoting local participation as a silver bullet for poverty reduction, to characterizing the mainstream application of "participatory development" as a meaningless technocratic exercise [22], to the contemporary reclamation of participation as a fundamental ingredient of social change—if accompanied by rights of citizenship and institutional reforms [23]. Since the 1960s, scholars have developed numerous scales for assessing the extent of true local participation in conservation and development projects. One of the most well-known comes from Arnstein [24], who points out that practitioners tend to describe a range of interactions with local stakeholders as "participation", ranging from non-participation (e.g., manipulation), to tokenistic consultations, to genuine forms of participation, such as "partnership", "delegated power", and "citizen control".

Consistent with Arnstein’s view of participation, we characterize participation in REDD+ along a seven-scale gradient (Figure 2). This participation scale, along with the framework indicators, is used to measure how REDD+ projects are affecting local populations’ opportunities, security, and empowerment.

Figure 2. Characterizing “participation” in REDD+.



3. Data and Methods

We focus on projects certified by the Climate, Community, and Biodiversity (CCB) Alliance standard because these projects report on participation and benefits in a thorough and systematic fashion. Because we are concerned with projects that are actually being implemented and have begun to demonstrate results, we examine only those CCB projects that have made it through the validation stage. Validation indicates that CCB certifies the project design; verification occurs at a later stage to examine the project’s actual results. However, at the validation stage initial results regarding security and empowerment effects (as defined in our framework) are documented and some projects already have initial demonstrated impacts on jobs, income, and infrastructure to report. We limit our sample to REDD+ projects in developing countries. As of 1 February 2012, there were 39 developing country projects validated under the CCB. We exclude two of these projects (both in Indonesia—Ulu Masen and Rimba Raya) due to recent reports that on the ground activities have stalled and the projects may not continue [25–27]. We also include other projects with thorough documentation of initial socio-economic outcomes. Based on this search, we add the following cases to our sample: a Cambodian project that is currently undergoing CCB validation; The Nature Conservancy’s long-running Noel Kempff project in Bolivia; six projects validated by the Plan Vivo standard, which also requires systematic reporting on local participation and benefits; and one that is being developed by an indigenous community in the Brazilian Amazon. In sum, our sample includes 41 REDD+ projects across 22 countries. Fourteen of these projects are in Africa, eight in Asia, and nineteen in Central and South America. We review these projects’ Project Design Documents (PDD), and, where available, supplement this information with external reports and information reported on project websites (see the Electronic Supplementary Materials for a list of reviewed documents).

These projects are being developed by a range of actors, and often involve collaborations between multiple organizations. Six of the projects are being developed by a public-private partnership.

Conservation NGOs are involved in the development of 16 of the 41 projects (11 involve international NGOs, 9 involve national NGOs). For-profit companies are involved in 21 of the 41 projects (15 involve international companies, four involve national companies). International donors and foundations are involved in the development of six of the projects and national governments are involved in two. Only one project was initiated and being developed by the local community themselves.

Table 1 provides an overview of the geographic, demographic, and institutional characteristics of projects in the study sample. The projects are situated in a range of ecosystems, from dry degraded grassland to intact tropical rainforest. Only 16 of the 41 projects are in rainforest and the vast majority of these are in Central and South America. The Africa and Asia projects tend to be located in dryland or temperate ecosystems. Project zone size varies tremendously, from a small 42 hectare (ha) Plan Vivo project in Nicaragua, to the 642,184 ha Noel Kempff project in Bolivia. The range of total carbon benefits that projects aim to produce over their lifecycles is wide: from 2168 t CO₂e for an afforestation/reforestation project in temperate China to 189,767,028 t CO₂e for the Juma project in Amazonas, Brazil. The size of local populations that could potentially be affected by these projects (not including voluntary tree-planting initiatives) ranges from 1025 people at Noel Kempff to 250,000 people at a project in the degraded rainforests of Kenya, located in one of the most densely populated areas of the world.

Table 1. Geographic, demographic, and institutional characteristics of REDD+ projects in study sample: Descriptive statistics.

Project Characteristics	Africa (<i>n</i> = 14)	Asia & Pacific (<i>n</i> = 8)	Central & South America (<i>n</i> = 19)	All Projects (<i>n</i> = 41)
<u>Countries</u>				
(# of projects)	Ethiopia (1), Kenya (5), Malawi (1), Mozambique (1), Tanzania (3), Uganda (3)	Cambodia (1), China (3), India (1), Papua New Guinea (1), Philippines (2)	Belize (1), Bolivia (2), Brazil (4), Columbia (1), Costa Rica (1), El Salvador (1), Mexico (2), Nicaragua (2), Panama (2), Paraguay (1), Peru (2)	22 countries
<u>Agro-ecosystem: # (%) of projects</u>				
Tropical rainforest	2 (14%)	1 (13%)	13 (68%)	16 (39%)
Dry, temperate or montane forest or woodland	8 (57%)	5 (63%)	4 (21%)	17 (41%)
Cropland/pasture	5 (36%)	2 (25%)	6 (32%)	13 (32%)
Grassland	9 (64%)	3 (38%)	3 (16%)	15 (37%)

Table 1. Cont.

Project Characteristics	Africa (n = 14)	Asia & Pacific (n = 8)	Central & South America (n = 19)	All Projects (n = 41)
<u>Project area (hectares) ^a</u>				
Median	5,243	4,366	9,645	5,894
(Min–Max)	(488–511,392)	(177–521,000)	(42–642,184)	(42–642,184)
<u>Carbon benefits (t CO₂e) ^b</u>				
Median	1,005,788	267,035	1,298,324	1,111,576
(Min–Max)	(3,789–48,000,000)	(2,168–98,441,367)	(6,306–189,767,028)	(2,168–189,767,028)
Total	65,812,124	107,875,494	236,344,361	410,031,979
% of study sample	(16%)	(26%)	(58%)	(100%)
<u>Local population size ^c</u>				
Median	3,898	11,423	3,898	10,277
(Min–Max)	(6,000–665,575)	(2,108–121,703)	(1,025–174,806)	(1,025–665,575)
<u>Ex-ante formal tenure: # (%) of projects</u>				
State property	5 (36%)	5 (63%)	3 (17%)	13 (33%)
Joint management	3 (21%)	2 (25%)	2 (11%)	7 (18%)
Communal property	5 (36%)	4 (50%)	5 (28%)	14 (35%)
Individual property	4 (29%)	3 (38%)	14 (78%)	21 (53%)
Contested	0 (0%)	1 (13%)	3 (17%)	4 (10%)

^a Three projects did not report the size of the project area; ^b Total tCO₂e projected to be avoided or removed over the project lifetime, which varies from 20 to 100 years (most 20–30 years); ^c Projects vary in how they report the size of the local population: some include those residing in the general administrative unit, others report local population size as the number living within the actual project area (which may or may not include those within the leakage belt). Nine projects did not report any quantitative information on local population size.

Nearly all projects (35/41) are addressing small-scale drivers of land-use change and only eight are addressing the major drivers of forest loss—industrial agriculture (crops and/or cattle) (see Figure 3). Many projects embody the integrated nature of REDD+ and their activities fall into numerous REDD+ categories: afforestation/reforestation (A/R), agroforestry (AF), sustainable forest management (SFM), assisted regeneration, or conservation (REDD). As Figure 4 shows, nearly 76% of projects are engaging in A/R, 44% in REDD, 29% in AF, 27% in SFM, and 5% in regeneration. Projects are also employing multiple intervention strategies, with payments for ecosystem services the most common at 39%, followed by integrated conservation and development and plantations (each at 29%), protected areas and woodlots (each at 15%), and community-based forest management, alternative fuels, ecotourism, unconditional cash transfers, and lastly health measures, improved agriculture, and timber concession (see Figure 5).

Figure 3. Predicted land-use in the without-project scenario ($n = 41$).

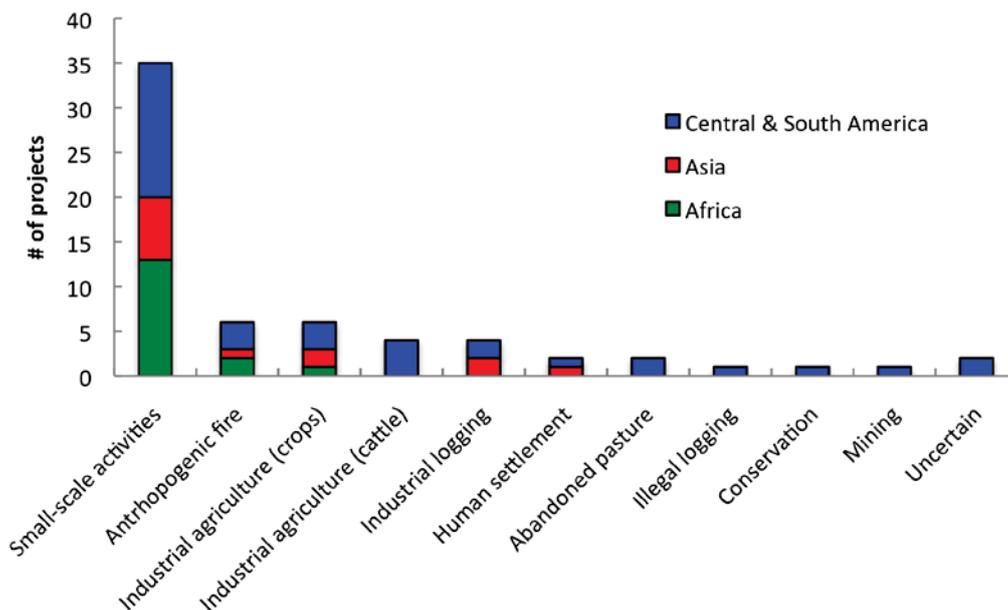
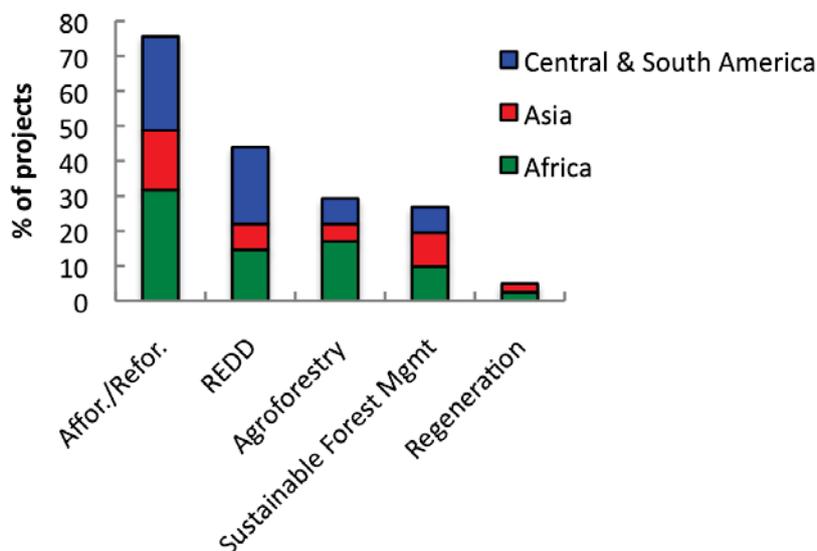


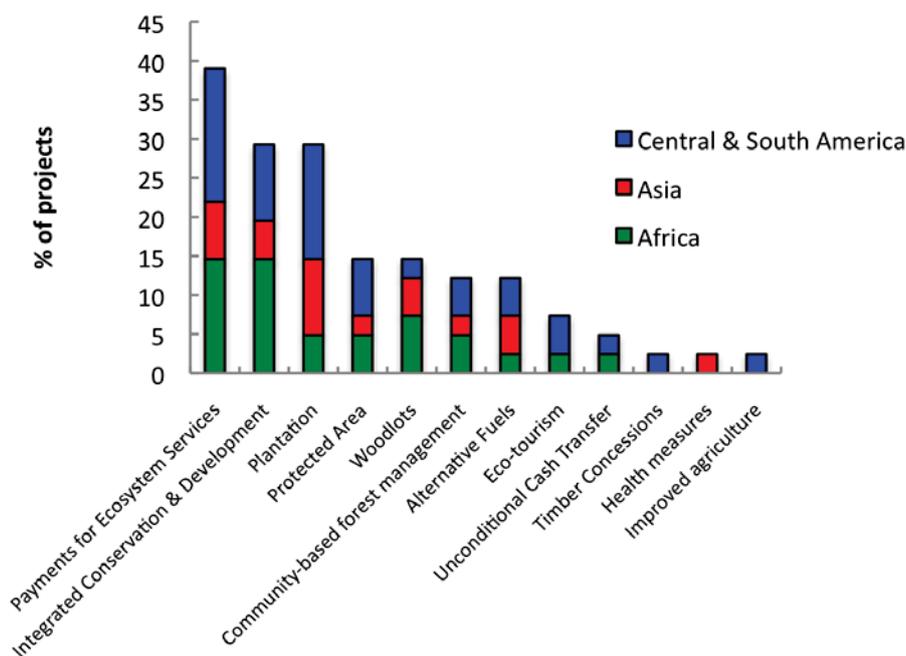
Figure 4. Types of REDD+ represented in the study sample ($n = 41$).



To measure the initial effect of projects on opportunities, we note how many jobs have been created or lost; the amount of payments that have been transferred to the local population; and project contributions to health, education, and infrastructure. We count only those jobs and payments that projects report having already been achieved and not those that are projected to be achieved. To characterize how projects are affecting security, we note whether projects are enhancing or weakening local populations’ property/management rights and how projects are affecting locals’ forest access and use. We also note whether projects report preventing in-migration to the project area or resettling any of the population. We attempted to score projects’ effects on carbon rights and ecosystem services important for health, water, and food security, but there was not systematic reporting on these aspects across project documents. To score projects on their empowerment effects, we review projects’ descriptions of how they are involving local populations in project design and implementation and

identify which of the seven categories listed in Figure 2. best characterizes their participation processes. We ranked a project's participation process as "FPIC" if the project documents explicitly state that a community's/individuals' agreement to the project had been obtained and that populations received information about project plans prior to agreement. All PES projects using contracts were thus considered to have obtained FPIC. More than one participation process typology is identified for those cases where projects employ different modes of engagement with different affected populations. Non-systematic reporting of projects' effects on social capital precluded inclusion of this aspect of empowerment in our review. The disaggregated data is provided in the Supplementary Materials.

Figure 5. Intervention strategies deployed by REDD+ projects ($n = 41$).



After scoring each project against our participation and benefits framework, we identify which projects have, to date, produced the most results in terms of opportunities, security, and empowerment for local populations. Here, it is important to distinguish between a project's outcomes (observed deliverables) and its impacts (the actual effects of the project, identified by comparing observed outcomes to a counterfactual scenario, ruling out rival explanations for changes in outcomes and addressing endogeneity bias). Since our review is of outcome data only, we don't have a good sense of what levels of jobs, income, property rights, or participation populations would have experienced in the absence of the project. It would therefore be inappropriate to use this data to reach definitive conclusions about socio-economic impacts (positive and negative) in REDD+. However, this qualitative review of early outcomes can fill an important gap by providing an inventory of what, if any, socio-economic benefits REDD+ projects are already delivering. This inventory can help us identify trends, generate hypotheses, and build an improved framework for understanding how changes in forest management and incentives are affecting livelihoods in REDD+.

4. Results

4.1. Opportunities

For many projects, it is simply too early to assess whether they have produced material benefits for communities. But, as Table 2 shows, 21 projects in our sample have generated either jobs, payments, or made in-kind contributions to local communities' educational systems and infrastructure (*i.e.*, electrification, roads). Of these projects, 14 have generated jobs, with total jobs ranging from 8 to 250 (or <1 to 15 per 1000 people living in the project vicinity). Nine projects have enrolled individuals in PES schemes. Total number enrolled ranges from 22 to 30,890 (or 2 to 617 per 1000 people living in the project vicinity). Only 7 projects have thus far transferred payments to local populations, with total payments ranging from \$426 to \$444,576 (occurring over various time periods). For those projects that have transferred payments to individuals or households, this represents, approximately, a range of <\$1–\$134 per project participant per year. Projects' contributions to infrastructure have been relatively minor. Seven have made contributions to educational systems.

Not surprisingly, those projects producing the highest level of non-wage income are those making direct payments to populations. These are mostly tree-planting PES projects. Two of these high opportunity benefits projects (Juma, Brazil and an ICDP project in Kenya), however, have a different design: Focused on protecting existing forests, they are extending cash transfers to households in order to build political support for conservation, rather than make payment conditional on carbon service provision as in a PES scheme. Also not surprisingly, the projects delivering the most opportunity benefits tend to be the longer-running projects. The reforestation projects have tended to create more jobs than projects focused on protecting standing forests.

While the creation of new jobs and revenue streams is notable, it is important to note that the size of the payments transferred to date is not very large. In the one project whose socio-economic impacts were evaluated using a before-after-control-intervention design (Sofala in Mozambique), the study found that carbon payments did not have a significant impact on household income [28], suggesting that while REDD+ can provide a new revenue stream for rural populations, it may have limited impacts on poverty reduction.

Table 2. REDD+ projects reporting opportunity benefits ($n = 21$).

Project	Total jobs (per ha.; per 1000 people)	Total non-wage payments (per ha.; per participant) ^a	Total enrolled in program (per ha.; per 1000 people)	Contributions to education ^b	Contributions to infrastructure	REDD+ type ^c	Intervention type ^d	Social certification standard(s)	Year started; ^e validated
AFRICA (11)									
TIST Program in Kenya (CCB-001)	55 (<1; 1)	\$188,900 (\$121; \$6)	30,890 (20; 618)	NR ^f	NR	Affor., Refor., AF	PES	CCBA 2nd Ed.	2004; 2011
Kasigua Corridor REDD Project (Kenya)	32 perm.; 14 temp. (<1; 1)	\$91,942 to 13 communities in leakage belt; \$6,092 to 12 community nurseries for seedlings (\$3; NR)	NR	85 scholarships; \$37,250 for construction, renovation, electricity, computers	NR	REDD, some AF and Refor.	ICDP, UCT	CCBA 2nd (Gold)	1998; 2009
Kasigua Corridor REDD Project Phase II–Community Ranches (Kenya)	8 (<1; <1)	\$426 (<\$1;N/A)	N/A	NR	NR	REDD, Refor.	CBFM, ICDP, Eco-tourism	CCBA 2nd (Gold)	1998; 2011
TIST Program in Kenya (CCB-002)	56 (<1; 1)	NR	9,013 (3; 173)	NR	NR	Affor., Refor., AF	PES	CCBA 2nd (Gold)	2004; 2011
Trees of Hope (Malawi)	NR	NR	1290 (3; 2)	NR	NR	AF, Affor., SFM	PES, ICDP	Plan Vivo	2007; 2011
Sofala Community Carbon Project (Mozambique)	170 (<1; 6)	\$223,750 (<1; \$79/year)	1835 (<1; 66)	Community funds used to build schools, though no additional in-kind contributions	NR	REDD, AF	PES	Plan Vivo & CCBA 2nd (Gold)	2002; 2007 (Plan Vivo), 2010 (CCBA)
Reforestation in Grassland of Uchindile, Kilombero & Mapanda, Mufindi (Tanzania)	50 perm.; 3–400 temp. (<1; 7)	NR	N/A	Transported building materials for 1 school	12 km of road; 12 bridges	Affor., Refor., REDD	ICDP	CCBA 1st (Silver)	1997; 2009
Emiti Nibwo Bulora (Tanzania)	NR	NR	24 (<1; 3)	NR	NR	AF, Refor., Affor.	PES	Plan Vivo	1994; 2009

Table 2. Cont.

Project	Total jobs (per ha.; per 1000 people)	Total non-wage payments (per ha.; per participant) ^a	Total enrolled in program (per ha.; per 1000 people)	Contributions to education ^b	Contributions to infrastructure	REDD+ type ^c	Intervention type ^d	Social certification standard(s)	Year started; ^e validated
AFRICA (11)									
Reforestation in Grassland Areas of Idete, Mufindi District, Iringa Region (Tanzania)	17 perm.; 350 temp. (<1; 2)	NR	N/A	Built 21 classrooms	Built 2 bridges and 14 km of road	Affor.	Plantation, Woodlots	CCBA 1st (Silver)	2006; 2011
Kikonda Forest Reserve Reforestation Project (Uganda)	200–300 (<1; 15)	NR	N/A	School support	NR	REDD, Affor., SFM	PA, Woodlots	CCBA 1st (Silver)	2002; 2009
Trees for Global Benefits (Uganda)	NR	\$444,576 (NR; \$134/year)	395 (NR; NR)	NR	NR	Affor., Refor., AF, REDD	PES	Plan Vivo	2003; 2009
ASIA (1)									
Reforestation of degraded land in Chhattisgarh (India)	90 (workdays equivalent) (<1; 9)	NR	N/A	Sponsoring teachers	Electricity, streets, walkways	Affor., SFM	Plantation, Alt. Fuels	CCBA 1 st (Gold)	2002; 2009
CENTRAL & SOUTH AMERICA (9)									
Boden Creek Ecological Preserve (Belize)	30 (<1; 24)	NR	N/A	NR	NR	REDD	PA, Eco-tourism	CCBA 2nd (Gold)	1996; 2005
Noel Kempff Mercado Climate Action Project (Bolivia)	10 full-time; 80 part-time/temp (<1; 10)	NR	N/A	Refurbished 3 schools, paid 2 teacher salaries, sponsored 120 scholarships, donated supplies	Repaired road	REDD	PA, ICDP, CBFM	Other non-social	1996; 2005

Table 2. Cont.

Project	Total jobs (per ha.; per 1000 people)	Total non-wage payments (per ha.; per participant) ^a	Total enrolled in program (per ha.; per 1000 people)	Contributions to education ^b	Contributions to infrastructure	REDD+ type ^c	Intervention type ^d	Social certification standard(s)	Year started; ^e validated
CENTRAL & SOUTH AMERICA (9)									
Juma Sustainable Development Reserve Project in Amazonas (Brazil)	NR	\$280,000 (<\$1; \$37/year)	NR	NR	NR	REDD	PA, ICDP, UCT	CCBA 1st (Gold)	2005; 2008
Scolec Te (Mexico)	NR	NR	2,437 (<1; NR)	NR	NR	AF, Affor., Refor., REDD	PES, Alt. Fuels	Plan Vivo	1996; 1996
Carbon Sequestration in Communities of Extreme Poverty in the Sierra Gorda (Mexico)	NR	NR	60 (<1; 3)	NR	NR	Refor., SFM	PES	CCBA 2nd (Gold)	1987; 2011
Limay Community Carbon (Nicaragua)	NR	\$2,071 (\$49; \$94)	22 (<1; 2)	NR	NR	Refor.	PES, Alt. Fuels	Plan Vivo	2007; 2011
CO ₂ OL Tropical Mix Reforestation Project (Panama)	59 perm., 141 temp. (<1; 33)	NR	N/A	NR	Road maintenance	Refor.	Plantation	CCBA 2nd -withdrawn and resubmitted as new project after validation	2007; 2011
Panama Native Species Reforestation	51 perm., 30–40 temp. (<1; 13)	NR	N/A	NR	NR	Refor.	Plantation	CCBA 1st (Gold)– validation expired Feb 2012	2006; 2007
Madre de Dios Amazon REDD Project (Peru)	9 perm., 12 temp. (<1; 1)	NR	N/A	NR	Road maintenance	REDD, SFM	Timber concession	CCBA 1st (Gold)	2006; 2009

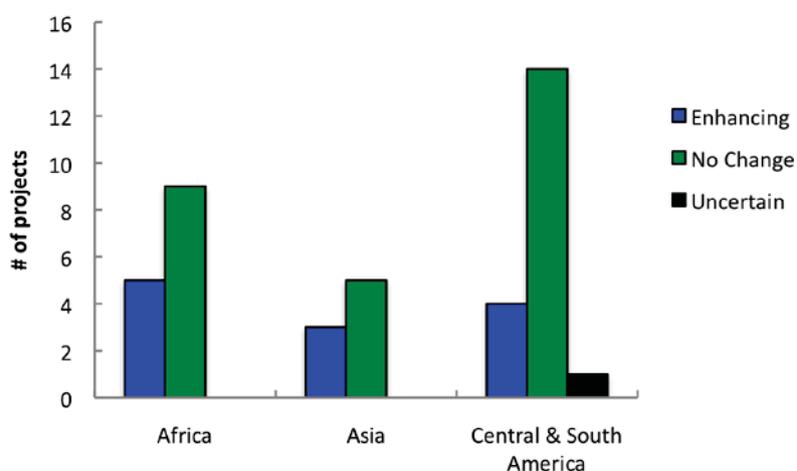
^a Payments per participant as reported in project documents. Where not reported, payments per participant estimated by dividing total payments by total enrollees and converted to annual amounts where payment time period clearly reported; ^b Only contributions to non-project related education noted (*i.e.*, training related to REDD+ interventions not noted); ^c REDD+ types abbreviated as follows: Afforestation (Affor.), Agroforestry (AF), Assisted Regeneration (Regen.), Reducing deforestation and/or degradation (REDD), Reforestation (Refor.), Sustainable Forest Management (SFM); ^d Project intervention types abbreviated as follows: Alternative Fuels (Alt. Fuels), Community-based Forest Management (CBFM), Eco-tourism, Integrated Conservation and Development Project (ICDP), Payments for Ecosystem Services (PES), Plantation, Protected Area (PA), Unconditional Cash Transfer (UCT), Woodlots; ^e Project start date indicates commencement of forest management and community development activities and not the beginning of the carbon crediting period; ^f “NR” indicates not reported—either because too early in project lifecycle or contribution is 0.

4.2. Security

4.2.1. Effects on Customary Tenure

In contrast to the opportunities outcomes, it is possible to discern projects' reported impacts on tenure for all but one project. According to the information provided in the PDDs, it appears that twelve of 40 projects are enhancing local populations' land ownership and management rights, no projects report information indicating a weakening of tenure rights, and 28 projects appear to be inducing no change in tenure arrangements. There are clear regional trends in projects' tenure effects (see Figure 6), just as there are clear regional trends in ex-ante tenure (see Table 1). The regional ex-ante tenure trends in our sample correspond to those identified in the most recent global review [29]. Most of the Central and South America projects are not changing tenure since individual or communal property/management rights are already clearly established in many of these settings. In Africa and Asia, however, where formal state ownership is a more common ex-ante tenure condition, we find a greater percentage of projects enhancing local populations' land ownership and management rights.

Figure 6. REDD+ projects' effects on local populations' land tenure ($n = 41$).



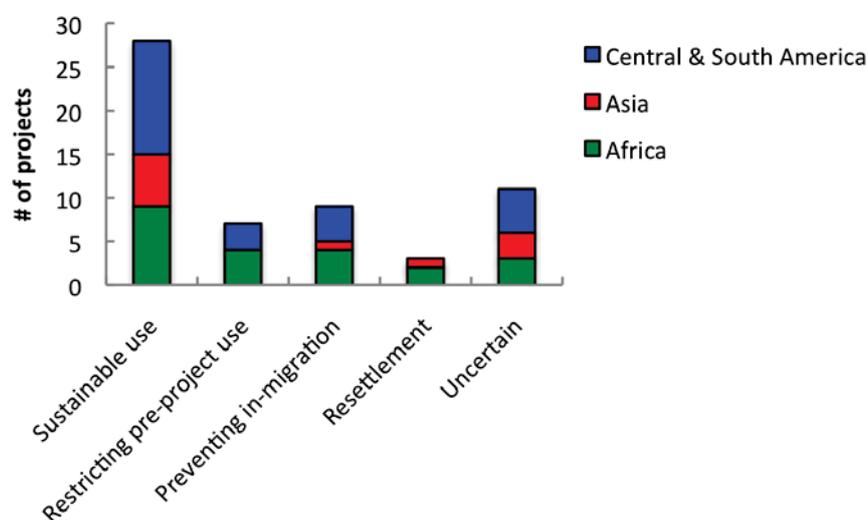
Contrasting with fears that REDD+ will induce land grabs, our review of project reports indicates that these early REDD+ projects are instead doing more to enhance local populations' land claims. This is an important, transformational effect that projects can have—and likely more enduring than carbon payments. Projects are enhancing tenure rights in a variety of ways. Notable examples include the Oddar Meanchey project in Cambodia, which helped numerous communities take advantage of new decentralization reforms and obtain management rights to community forests. Noel Kempff helped a local community establish, delimit, and title a 360,565 ha Indigenous Territory, which includes a community-managed logging concession. In the Philippines, a reforestation project is helping communities renew their tenure rights, which requires that 20% of the land be forested.

Initiatives to enhance tenure such as these can require significant effort and time. The Noel Kempff project spent nearly a decade helping the indigenous community gain official tenure rights: first, the project helped the community form a group with legal standing that could apply for the rights; in 1998, they made the request; and, finally, obtained land title in 2006.

4.2.2. Understanding Changes to Forest Access and Use and Water, Health, and Food Security

It is also possible to discern at this stage how projects are affecting access and use, though in some cases effects on certain sub-populations were unclear (see Section 5). As Figure 7 shows, most projects appear to be attempting to put communities on a path towards sustainable use, though at least seven are restricting use for some sub-populations. In terms of resettlement, only three projects in the sample reported resettling populations (all small in number). Nine projects are planning to prevent in-migration. Assignment of carbon rights appeared to be uncertain for many projects, though all possibilities are represented in the sample (*i.e.*, carbon owned by the state, project developer/investors, local population, or a combination thereof).

Figure 7. REDD+ projects' effects on land access and use ($n = 41$).



Rather than placing outright restrictions on locals' use of forest resources, most projects are instead trying to help communities develop sustainable use strategies, via either tree planting or forest management activities. However, our project document review reveals that more attention to access and use issues where multiple populations are present is necessary. This is particularly the case where projects are trying to reform open-access regimes and the measures taken to ensure long-term sustainable management impact users whose livelihoods had become reliant on the open-access resource. For example, there were several projects in China and Central and South America that reported obtaining agreement from landowners for the project, but then also reported that grazers' use of the land would be stopped. Some of these projects described consultation processes with these grazers and finding them alternative land, but others did not.

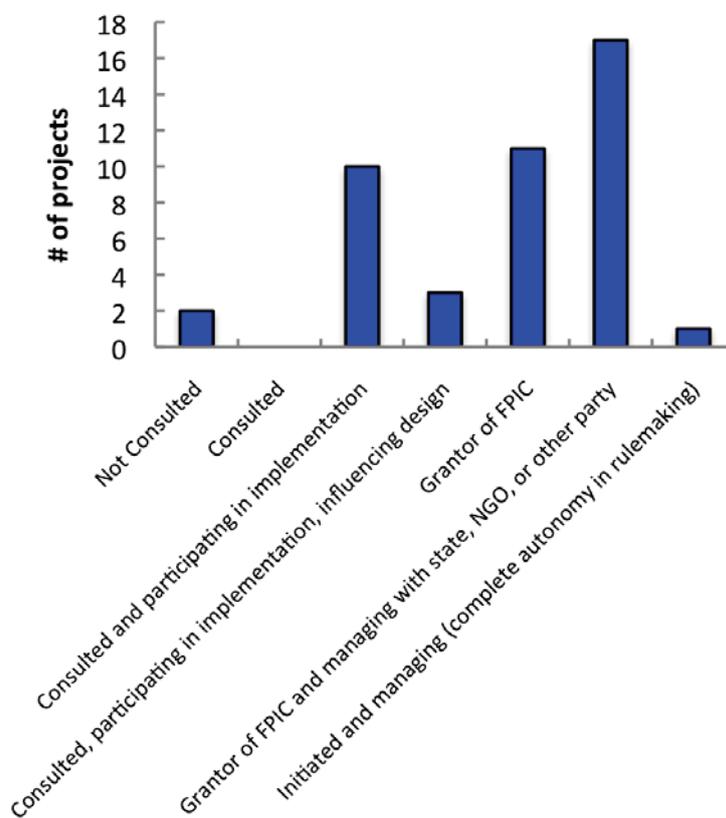
Projects' effects on ecosystem services important for water, health, and food security were often unclear. We initially sought to analyze how projects were affecting these services, but projects' non-explicit reporting on these dimensions made systematic categorization difficult.

4.3. Empowerment

Most projects (see Figure 8) are, based on our criteria, going beyond minimum levels of requisite consultation and participation to obtain the free, prior, and informed consent (FPIC) of local

populations for REDD+. (The 2nd edition of the CCB standards requires that projects obtain local populations' FPIC. Sixteen of the 41 projects in the study sample have been validated against the CCB 2nd edition.) However, for some projects interacting with multiple populations, extent of participation is not always even across groups, as the discussion of divergent consultation processes with grazers vs. landowners in open-access regimes above indicates. All of the seven projects restricting land use for some scored on the lower rungs of the participation gradient. We don't find evidence of any regional differences in participation.

Figure 8. Participation of local populations in REDD+ projects ($n = 40$).



One project (the Surui Indigenous Peoples project in Brazil) achieved the top tier participation level in our framework: project initiation and management (full autonomy in rulemaking) and provides best-practice guidance on how to conduct a FPIC process. The Surui Carbon Project was initiated by the community's Chief, who then conducted a FPIC process in accordance with the Surui's traditions. The idea of the REDD+ project was first proposed and explained to all community members and follow-up meetings were then held over a months-long period to allow ample time and the appropriate venues for deliberation and clarifications. Community consent was ultimately reached in a transparent and non-coerced fashion and the details of the process were documented and shared with the public. It must be noted, however, that the Surui situation is unique and it may be challenging for other projects to replicate their success. For one, the Surui are a traditional, cohesive community. Further, this case study highlights the impact one committed dynamic leader can have on a project's success.

5. Discussion

5.1. Can REDD+ Deliver “Win-Wins” for Poverty and the Environment?

We now return to question of whether REDD+ can deliver “win-wins” for both poverty and the environment. Our results shed some light on this question and indicate the need to carefully consider the following factors when analyzing poverty-environment relationships: (a) the geographic scale of analysis, (b) distinguishing between poverty alleviation and poverty reduction, and (c) how “poverty” or “well-being” is defined.

Our results indicate that the tree-planting and PES projects in our sample tend to produce higher opportunity benefits, in terms of jobs and income, respectively. The majority of these opportunity benefits are produced by projects in Africa. These findings support Funder’s [30] argument that agroforestry, forest restoration, and afforestation/reforestation initiatives will be more pro-poor than avoided deforestation projects in REDD+.

At the project level then, this might indicate a strategy for delivering win-wins. However, if we expand our analysis to the global scale, then some poverty-environment tradeoffs begin to emerge. We find that while Africa accounts for 77% of payments and 72% of jobs produced in our sample, the continent accounts for only 16% of the samples’ total projected carbon benefits (see Tables 1 and 2). Explaining why the Africa projects account for most of the jobs and payments is challenged by our small sample size and the simultaneous effects of project type, project duration, and project participants’ opportunity costs. It may be that given the lack of available alternatives in many African regions, REDD+ offers the best opportunity for income-generation. This finding might then be consistent with predictions that carbon emissions avoidance/removals will first be achieved in Africa since the continent has the lowest opportunity costs and thus lowest marginal abatement costs [31]. (Indeed, the deforestation hotspot of Indonesia—where it remains to be seen whether carbon prices will ever be able to outcompete lucrative oil palm—is notably absent from our sample.) The per hectare carbon benefits of tree-planting projects in the drylands of Africa are of course much less than those in tropical rainforests. And the population density is much lower in intact tropical rainforests than it is in the degraded savanna woodlands of Africa. These simple observations provide a reality check on the belief that we can simultaneously reduce poverty and maximize climate benefits in REDD+. Instead, it appears that those landscapes with the largest carbon stocks and potential climate gains will often not overlap with those regions home to the most potential beneficiaries. Further, the fact that the vast majority of projects in our sample are focusing on small-scale drivers of forest loss and not on the large-scale drivers known to be the major causes of forest destruction such as commercial agriculture and ranching [32] also lends support to the notion that there may be poverty-environment tradeoffs in REDD+.

Our results also highlight the importance of distinguishing between poverty *alleviation* and poverty *reduction* when analyzing poverty-environment relationships. We find that the number of jobs created and size of payments transferred thus far amongst those projects producing opportunity benefits to be modest. It may be that even where REDD+ projects compensate affected populations for any losses and create jobs and new income streams, they hold stronger potential as vehicles for poverty alleviation rather than engines of economic growth. REDD+ can also contribute to poverty alleviation

by solidifying tenure rights, enhancing communities' capacity for forest management and other collective action initiatives, and sustaining ecosystem services important for food security and adaptation to climate change. All of these potential pro-poor impacts of REDD+ are frequently identified in the REDD+ literature [30]. However, whether or not we identify these non-income benefits of REDD+ depends on the indicators used to evaluate realized impacts.

Therefore, how we define "poverty" and "well-being" may affect whether or not we identify win-win or win-lose poverty-environment relationships in REDD+. Our results show that while the opportunity benefits of REDD+ may be modest, the security and empowerment benefits might be more significant—at least in the short term. Therefore, traditional measures of poverty and welfare that consider only the impact of REDD+ on consumption, income, or jobs might fail to capture its full effects on well-being. Using a multi-dimensional measure of well-being that builds off Sen's "capabilities approach", such as the one used here, can do a better job of capturing the impacts of REDD+ on tenure and participation. This framework may also be useful for capturing impacts on ecosystem services important for food, health, and water security. If we accept such a definition of well-being, then the results presented here offer some initial evidence of REDD+'s potential to deliver win-wins for poverty and the environment. Our findings are consistent with Barbier and Tesfaw's [13] hypotheses about conditions for win-wins in REDD+ as well as Wunder's [33] conjecture that PES programs are likely to produce only modest income benefits but may help the rural poor increase their tenure security. Over the longer term, REDD+'s impacts on ecosystem services should be able to be identified—evaluation of these security benefits should yield further nuanced understanding of poverty-environment relationships.

5.2. Achieving and Improving Meaningful Participation in REDD+

Indigenous peoples' right to give or withhold their FPIC for activities affecting lands they have customarily occupied or used is codified in the UN Declaration on the Rights of Indigenous Peoples, which was passed in 2007, after over two decades of negotiations [34]. The World Bank Group has been under intense pressure to adopt FPIC policies for many years. Now, advocates are seeking to guarantee that REDD+ donors and the United Nations Framework Convention on Climate Change (UNFCCC) recognize and uphold the rights of both indigenous and other local communities to FPIC. Given the intensity of debates over FPIC in REDD+, it is notable that so many projects in the sample met our criteria for FPIC.

However, our review also reveals that projects require more guidance on how to obtain and sustain FPIC, as well as the principles underlying it. One project, for example, reported that they had obtained FPIC by communicating with all of the project investors and obtaining their agreement to go forward with the project (this project was not scored as FPIC in our review). The extent of information conveyed to populations was not always well described, which sometimes challenged our independent assessment of how truly "informed" a household or community was before they agreed to the project. In particular, details about contract structure were often not included in project documents, nor were descriptions of how well people were informed about possible ranges in future carbon payments. Other recent studies examining how REDD+ projects are interacting with communities have also raised questions about the extent to which communities are being properly informed about project plans.

Both Awono *et al.* [35] and Sunderlin and Sills [36] find that uncertainty about the forest carbon market and REDD+ policy is causing project developers to delay community consultations and information sharing regarding project plans. The motivation for this delay is often to avoid raising community's expectations about potential carbon payments and other benefits. More work could be done by the REDD+ community to provide guidance on how to conduct FPIC processes in the context of such policy and market uncertainty.

It must also be noted that most of the projects we ranked as "FPIC" were interacting and obtaining consent from multiple individuals separately via PES contracts. Participation and FPIC processes are of course much more complicated when community-level consent is required—and even more so when there are multiple communities or sub-populations in the project area.

5.3. Improving Measurement, Monitoring, and Reporting of Socio-Economic Impacts in REDD+

The PDDs reviewed in this study often contained detailed information on local communities and many number well over 300 pages. Nevertheless, extracting the specific information from these documents that we sought for our review was quite difficult. We found that projects do not systematically report on the actual size of the population potentially affected by the project, the number of jobs created, or the size of payments transferred per participant per year. Information about participation processes and tenure conditions was often better documented. Projects could also do more to estimate their impacts on local ecosystem services supporting populations' water, food and health security. Neglecting to quantify and value these local ecosystem services likely greatly underestimates REDD+'s full socio-economic impacts. Finally, in order to better understand the actual socio-economic impacts of REDD+, projects should more explicitly compare their observed outcomes (*i.e.*, jobs created, payments transferred) against a counterfactual scenario (*i.e.*, the social reference scenario of without-project conditions). While this step is required at the verification stage once climate and social benefits are actually realized and not the validation stage (*i.e.*, when the project design is approved), the PDDs produced at the validation stage do require that the social reference scenario be estimated and reported. We found many of these counterfactual projections to be quite general descriptions and how they would be used for comparison at the later verification stage was not always clear. Moreover, some projects in our sample have been verified but we still found that they often did not explicitly compare their observed outcomes to a reference scenario when reporting their realized social benefits. Caplow *et al.* [37] reached a similar conclusion after reviewing documentation for 20 "pre-REDD" projects (reduced deforestation and degradation projects initiated prior to 2007, when parties to the UNFCCC articulated their commitment to advancing REDD).

6. Conclusions

This article makes important contributions to ongoing conversations about the ability of REDD+ to deliver "win-wins" for poverty and the environment. We develop a three-component framework for assessing how REDD+ projects affect local well-being. This framework provides a useful structure for understanding different types of socio-economic outcomes, which are realized under different timescales. Using this framework, we found that many early REDD+ projects are delivering measurable socio-economic benefits by enhancing populations' tenure security and facilitating their empowerment

through meaningful participation in REDD+ project design and implementation. We also found that, to date, projects have produced only modest opportunity benefits (jobs, income) for local populations.

Our findings lead us to make several recommendations for those working on REDD+ policy and implementation. First, future evaluations of REDD+ socio-economic impacts should consider hypotheses derived from the trends we observe in this study: That A/R projects produce more jobs than REDD projects; that PES and cash-transfer interventions produce more income than other interventions; and that more meaningful local participation leads to greater opportunity and security benefits. Second, practitioners require more practical guidance on how to conduct community-level FPIC processes, especially in settings of non-cohesive communities with multiple sub-populations. All REDD+ initiatives need to pay greater attention to the “informed” component of FPIC, ensuring that individuals and communities have detailed information about project risks and opportunities and that this information-sharing process is documented. Third, REDD+ presents a window of opportunity for donors and practitioners to support communities and individuals in their quests for more secure tenure. Finally, as REDD+ scales up from site-specific projects to national programs, it is increasingly being linked to broader adaptation and economic development objectives—as evidenced by the recent UNFCCC text agreed to at COP 18 in Doha (see [38]). Strong market demand for forest carbon credits has not emerged as originally anticipated due to the failure of large emitters such as the United States to adopt cap-and-trade policies. Therefore, the future of REDD+ finance likely lies in the extent to which it can hook its sails to countries’ broader development and climate adaptation objectives [39,40]. The UNFCCC safeguards and “safeguard information systems” also require that REDD+ measure and report on its socio-economic impacts (see [38,41,42]). The benefits and participation framework developed and presented here can be used both by projects and countries to monitor, measure, and evaluate REDD+ impacts and capture important, but perhaps otherwise neglected, impacts on tenure and empowerment.

How representative is our sample of the universe of REDD+ projects? All but one of the projects in our sample has obtained (or is seeking) CCB or Plan Vivo certification. Since these voluntary standards require livelihood benefits, it may appear that our sample is biased. However, the CCB standard has been adopted by an estimated 64% of all forest carbon projects [5] and nearly 60% of forest carbon credits sold on the voluntary market in 2010 [6] and 29% of those sold in 2011 came from CCB-certified projects [7]. This trend is carrying over as REDD+ scales up to national programs, with the UNFCCC, World Bank, UN-REDD, and bilateral donors devoting increasing attention to livelihood impacts and social safeguards with each iteration of REDD+ policy and program design. Thus said, our findings do not disprove claims that some REDD+ projects are harming local populations [43]. The minority of projects not committed to positive social impacts and operating outside of CCBA or Plan Vivo may be yielding different outcomes from what we find here. Further, even if a REDD+ project or program is obliged to comply with social safeguard policies, negative outcomes may still occur and it is always possible that even project documents validated by a third-party can fail to capture realities on the ground. This underscores the need for rigorous socio-economic impact evaluation of REDD+. Indeed, commitment to such evaluation may be the most crucial social safeguard policy we can adopt to protect vulnerable populations [44].

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Conflict of Interest

The authors declare no conflict of interest.

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