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Are REDD+ community forest projects following the principles for collective action, as proposed by Ostrom?

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Abstract: Forested countries in the global south that have agreed to engage in REDD+, a policy mechanism for addressing climate change, are receiving support to improve laws, policies, systems and structures. As a mechanism initiated at the global level and seeking to use forests to address a global commons crisis (atmospheric carbon concentration), understanding how REDD+ translates into implementation at the local level is essential. Therefore, using a systematic review approach, we examined 15 studies of REDD+ in the context of public and/or community managed forests, drawn from a comprehensive application of inclusion criteria to identify relevant published peer-reviewed empirical research. The common property resources literature was used to highlight the role of local institutions in REDD+ and to distil how REDD+ community forest projects conform to Ostrom's collective action principles. The review revealed limited sharing of information and decision-making authority with communities; a general absence of FPIC; and a lack of defined benefit sharing and conflict resolution arrangements in many of the REDD+ projects.

Keywords: Climate change, collective action, forest, local communities, REDD+, systematic review

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1. Introduction

A decade, and several negotiations, after the initiation of incentivized avoided deforestation at the United Nations Framework Convention on Climate Change (UNFCCC) 11th Conference of Parties by Costa Rica and Papua New Guinea, the mechanism has seen significant metamorphosis. The proclaimed cost-effective mechanism for atmospheric carbon emissions reduction is currently referred to as REDD+, which stands for “Reducing Emissions from Deforestation and Forest Degradation” with the “+” including conservation, sustainable management of forests and enhancement of forest carbon stocks.

As negotiations proceeded under the UNFCCC, third party institutions such as the World Bank and UN agencies (UNDP, UNEP, FAO) rolled out the Forest Carbon Partnership Facility and the United Nations Collaborative Programme on REDD (UN-REDD) respectively, for interested developing countries to enter a REDD+ ‘readiness’ phase (Minang et al. 2014). The ‘readiness’ phase includes reforming governance processes; reviewing laws and policies; establishing national REDD+ strategies; designing workable and equitable benefits sharing arrangements; and establishing baseline scenarios or referencing emission levels (Mora et al. 2012; Minang et al. 2014).

REDD+ has faced significant criticisms relating to its implications for local communities’ livelihoods and socio-cultural life (Phelps et al. 2010; Minang et al. 2014). Early critiques of the mechanism, asserted that REDD+ discussions and ‘readiness’ activities by national governments, donors and funders focused too much on carbon and associated technical challenges. Issues given preference in the initial stages revolved around monitoring, reporting, verification, and establishing the baseline scenario for forest carbon emissions with little attention paid to social co-benefits such as community rights (Dooley et al. 2011; Lasco et al. 2013; Pasgaard 2013). Critics of REDD+ have warned of the mechanism’s potential to recentralize forest governance, marginalize local communities and resource users, bolster corruption and entrench inequity within the forest sector (Phelps et al. 2010; Larson 2011; Jaung and Bae 2012). There are also fears that benefits accruing from REDD+ will not be fairly distributed to local communities (Skutsch et al. 2013; Chomba et al. 2016). Some scholars have therefore called for REDD+ to recognize community rights to access, use and management of natural resources (Sandbrook et al. 2010); an advocacy based on a common problematic of national government failures in managing natural resources (Gibson and Becker 2000; Heltberg 2002; Delmas and Young 2009).

A critical part of the REDD+ ‘readiness’ process involves piloting the mechanism to draw out lessons and challenges, assessing the adequacy of systems and noting areas for reform to achieve REDD+ objectives. Though empirical studies

of REDD+ projects have started to emerge recently, many have focused on ‘readiness’ progress at national level, or on developing REDD+ at a regional forest scale such as the Congo Basin. Only subsets of studies examine REDD+ projects, where it is possible to assess their direct impacts on local communities. These include conservation projects that have been re-labelled as REDD+. Minang et al. (2014) acknowledge that all of these studies have adopted different indicators for measuring progress and this makes for a difficult comparison.

Therefore, this review systematically examines REDD+ literature drawn from global research to highlight trends and identify gaps in our understanding of how REDD+ project-level initiatives, implemented on community owned or public lands conform to principles for successful collective action. We do this by drawing on Ostrom’s (1990) common property rights (CPR) principles. The overarching question guiding this paper is: ‘what is the evidence regarding how REDD+ projects have performed according to a set of collective action principles for effective forest management?’

2. Conceptual approach

2.1. Collective action

There are complexities in the pursuit of global collective action to address climate change, including conflicts among political and economic interests (Ostrom 2009). While global consensus has been slow to materialize, climate action has been characterized by local, state and regional efforts such as in American metropolises, the State of California and Europe respectively (Ostrom 2009). This fragmented approach to climate action has been particularly evident in REDD+. While REDD+ was initiated by a global institution to address the contribution of forest loss to global emissions, it has since been operationalized largely at regional, state and local scales.

Particularly due to the multi-scalar characteristics associated with REDD+, it is critical that actors at all scales understand how norms, rules and structures (referred to collectively as ‘institutions’) shape REDD+ outcomes on the ground (Agrawal and Lemos 2007). Institutions, be it formal or informal, guide and shape stakeholder interactions and behaviour (Crona and Bodin 2011) including the ability to protect environmental integrity, advance social equity and enhance human wellbeing (Redman 2014). Functional institutional mechanisms to govern natural resource use have been shown to extend beyond private property arrangements and state ownership, to common property collective action (Agrawal 2002). The primary focus of this paper is on the intersection of REDD+ with these two latter forms, i.e. state and community-based forest management.

Ostrom (1990) identified a set of collective action principles that have proved essential for successful collective processes and outcomes in natural resource management. These principles help us to better understand how groups manage common property resources by means of well-established rules, laws and relational processes for formal and informal institutions. Subsequent research

has identified strong links between these collective action principles and forest condition (see Gibson and Becker 2000). Since Ostrom's identification of these principles in 1990, they have been subject to various theoretical debates and empirical evaluations (Gautam and Shivakoti 2005). A synthesis and analysis by Cox et al. (2010) of a large number (91) of subsequent studies evaluating the Ostrom CPR design principles provide empirical and evidential support to the principles.

The principles, totalling 8 in number, are expanded in Table 1 and highlight the importance of: setting clear boundaries of the resource and resource users; local knowledge of the ecological system; local networks that actively build trust and take decisions; environmental monitoring coupled with processes for feedback; and mechanisms for conflict resolution. However, according to the work of Cox et al. (2010), a couple of the principles need to be expanded to incorporate new aspects; for example, the principle on 'monitoring' must, in addition

Table 1: Collective action principles adopted from Ostrom (1990) as an analytical lens.

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- 1. Clearly defined boundaries** – The REDD+ forest project is well defined in geographical scope and boundary and assigned to a particular resource user group or community. This principle is often best served where land tenure is clearly defined with supporting documents to back titles. This effectively helps exclude external claims by 'foreign' unentitled parties. The greater the certainty of the boundary definition, the less costly it is to exclude outsiders.
 - 2. Congruence between resource environment, its governance structure and rules** – Governance structure and rules must be specific to local circumstances and characteristics of the REDD+ area. The rules and structures must evolve as the status of the resource and the resource environment change.
 - 3. Decisions via collective choice arrangements** – Decisions involve all the parties that have a stake in REDD+ forests. All voices matter and should be regarded for a generally satisfactory and accepted decision. Such collective choice arrangement processes should be well known by all stakeholders.
 - 4. Effective monitoring** – There is a system to monitor REDD+ and activities of stakeholders. Stakeholders of the resource play a major part in monitoring. All rules and monitoring outcomes should be transparent. This includes monitoring all safeguards that exist for REDD+ and the stakeholders in the project area. This principle requires a feedback mechanism.
 - 5. Graduated sanctions and punishments for violations** – All acts that go contrary to, or threaten the sustainability of, REDD+ and forest at large must be spelt out and publicly available to all stakeholders. Sanctions should be weighed against offences and repetitive violations should be more heavily sanctioned than first time violations.
 - 6. Low-cost and easy-to-access conflict resolution mechanism** – Stakeholders should be aware of where and how to channel grievances or conflicts. The resolution mechanism should be transparent, and handled by a trusted body with no conflict of interest. All grievances must be well documented.
 - 7. Right of resource appropriators to self-govern** – Authorities outside the REDD+ forest project area do not appropriate resources or their management and do not exclude or marginalize stakeholders and increase their vulnerabilities. Neither do state authorities practice remote governance; making the local community merely 'resource watchers'.
 - 8. Organized rules and enforcement via nested enterprises** – There are various systems at varying levels from the local community to the district, regional and national. The lessons from the REDD+ projects should rise through these vertical channels to inform national policy and international discussions. There is also horizontal nesting.
-

to environmental monitoring (the condition of the resource), encompass social monitoring (users monitoring each other's behaviour). We therefore incorporate these suggested sub-principles into the 8 CPR principles for our examination of government and non-state actor REDD+ projects on community lands to establish evidential trends. We are cautious to note that these principles are conceived as the minimum necessary for successful collective management and do not represent a panacea for forest management globally. Despite this, we chose to use Ostrom's collective action principles as criteria, to bind the systematic review within a universal framework that is helpful in contextualising and unpacking REDD+ projects.

2.2. Forest communities and community forestry

There are an estimated 1.2 billion people across the globe depending daily on forests in one way or another (den Besten et al. 2014). Out of this number, an estimated 300 million directly rely on forests for their livelihoods (Stoian 2005), and are frequently categorized as local forest communities or indigenous peoples (prevalent in South America and Asia), Whilst the affect of these local communities on forests is partly shaped by local needs, management decisions made at higher levels also affect their stake in the sustainability of natural resources and the development of local institutions to manage those resources (Agrawal 2002).

Not all communities dependent on forests are engaged in community forestry. Instead, forest management by communities spans full control and management at one extreme, to a total lack of engagement and involvement at the other (see Brown et al. 2002; Sunderlin et al. 2014). Between these two extremes, there are differing community forestry practices that comprise a host of arrangements, agreements and activities (Mayers and Vermeulen 2002). Community Forest Management (CFM) institutions take different forms based on the resources being managed such as timber, non-timber forest products, forest ecosystem services, among others (Larson et al. 2010). Under CFM, communities (self-defined and identified groups of actors) collectively govern forests based on shared rules, rights and obligations (Banana and Gombya-Ssembajjwe 2000).

A consolidated CFM requires the secured delineation and recognition of rights and obligations, referred to as tenure. Tenure over land and forests includes ownership and sets of rights such as rights to access, use, manage and exclude. These rights may be held by a person, another private entity, families, clans, communities or government (White and Martin 2002). Reportedly, many governments across the world have, over the years, devolved rights to local forest communities, based on existing evidence of local forest management being good for forests (Banana and Gombya-Ssembajjwe 2000).

However, Vijge and Gupta (2014) suggest that allocating authority over forests to communities has had mixed results across the globe, and likewise, such devolution offers no guarantee of REDD+'s success. Communities must therefore be treated on a case-by-case basis to promote understanding of the contexts of

host-REDD+ communities and the factors that enable the adoption of community management systems that effectively reduce carbon emissions and contribute to social benefits (Cerbu et al. 2013). With the advent of REDD+, this paper explores the performance of global projects in light of the set of collective action principles instigated for effective forest management.

Before proceeding with this analysis, it is important to mention a few caveats. While the focus of this paper on collective action under REDD+, not all REDD+ projects need be designed in ways that require the type of local collective action covered by Ostrom's principles. Secondly, 'communities' may be highly diverse, with members who differ in occupational status, religion, wealth, ethnicity, gender, length of community residence, and many other variables (Di Gregorio et al. 2008). These factors impact the ability (availability of time, money and social capital to participate and to voice opinions) of community members to influence processes. Thus collective action that succeeds in maintaining forest cover may, or may not, result in outcomes that are equally beneficial for all members of the community.

Just as community forestry may produce inequitable outcomes, REDD+ has been criticized for having negative impacts on communities, such as undermining local institutions (Corbera and Schroeder 2011). Therefore, and as a complement to these critiques, this study was designed to provide the first systematic evaluation of the empirical evidence on how REDD+ implementation is positively contributing to collective action and building communities, rather than causing harm.

3. Methods

3.1. Introduction to the systematic review

Systematic literature reviews vary from traditional reviews, and are relatively novel within the development and environment sector (Petrokofsky et al. 2011) and more so for forestry and REDD+. A well-defined methodological approach was laid down prior to the review, to make the process rigorous, transparent and replicable with a high certainty of producing similar results (Pickering and Byrne 2013). Using the systematic review approach, this study mapped out global REDD+ projects' implementation progress and gaps in REDD+ scholarship.

3.2. Review process

The review process comprised a three-tier approach: systematic search, critical appraisal and synthesis (Figure 1 – www.tandfonline.com). Within each tier, various steps were adopted and adapted from Pickering and Byrne (2013) as enunciated below.

This first tier consisted of 4 steps. We defined the topic of the systematic review to look into evidence regarding the performance of REDD+ implementation, according to a set of collective action principles proposed for effective forest management. We posed the research question; 'what is the evidence regarding

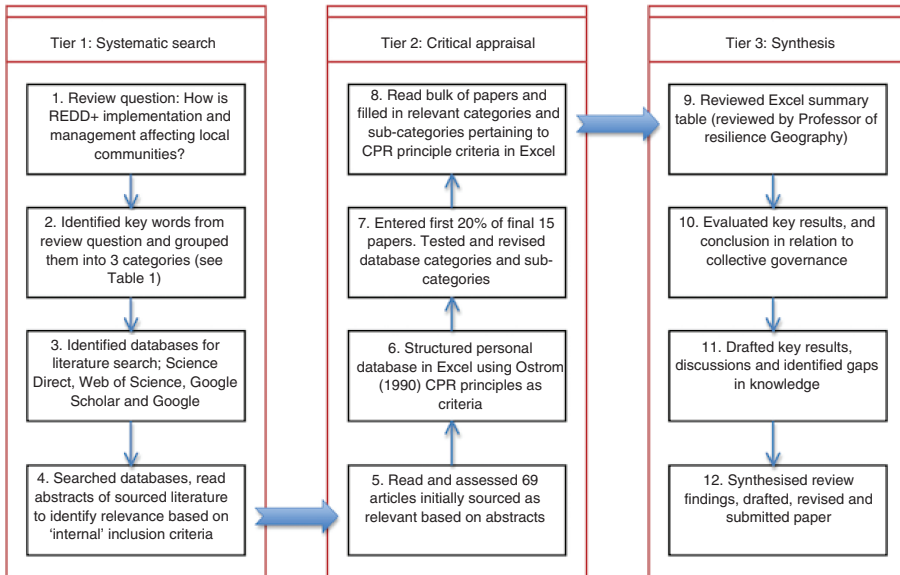


Figure 1: Systematic review process adapted from Pickering and Byrne (2013).

how REDD+ projects (on public and community lands) have performed according to a set of collective action principles for effective forest management?’ Based on the question, the study identified combinations of key words (Table 2), relevant to the literature search. The final tier 1 step identified databases and searched for literature. These databases were: Science Direct; Web of Science; Google Scholar; and Google. We used all combinations in Category 1 and Category 2 with ‘forest governance’ for the first set of searches. The second set of searches included all combinations of key words in Category 2 and Category 3 with ‘REDD+’. All combinations of searches used the logic ‘AND’ with no publication date limits stipulated. As the literature search took place in February 2014, none of the papers retrieved for review are after this date.

Table 2: Key words for database literature search.

Category 1	Category 2	Category 3
REDD+	Civil society	Forest governance
Forests in climate change	Local community	Institutions
Avoided deforestation	Forest communities	Forest management
	Indigenous peoples	Safeguards
	Local stakeholders	Participation
		Benefits

Under the second tier, we read all the abstracts of the literature sourced and ascertained their relevance to the key research question. Articles were judged based on a set of 'inclusion' criteria applied to abstracts to narrow the voluminous collection of studies retrieved by the keyword searches (Pickering and Byrne 2013). The 'inclusion' criteria, decided internally by researchers were: 1) articles had to be published peer-reviewed empirical research; and 2) had to focus on REDD+ projects, not general forest governance or management. By REDD+ project, this study refers to any project rolled out to reduce emissions from forests in line with UNFCCC forest-climate objectives and any previous conservation projects re-labelled as REDD+. Therefore, we use 'REDD+ projects' to also embody 'REDD+ like' projects that may or may not be officially recognizable under the UNFCCC. In this paper, we consider government-led REDD+ projects, government-recognized REDD+ projects and projects by non-state actors (such as NGOs and private investors) implemented on public or community lands. In validating papers based on their abstracts, a total of 69 papers passed the initial 'inclusion' screening. All 69 papers were again subjected to the 'inclusion' criteria via thorough reading of the entire contents. After which 15 papers met the inclusion criteria. This sample size reflects the stage of REDD+ development and is also not an unusual sample size for a systematic review.

A second set of criteria (with sub-categories) were framed in a Microsoft Excel database and used to assess the 15 articles. This second set of criteria was drawn externally, based on the works of Ostrom (1990), Dietz et al. (2003) and Cox et al. (2010). Ostrom's 8 CPR principles were adopted and adapted to serve as a lens for reviewing the final set of 15 papers. The first 20% of papers were entered into the database and an iterative process of testing and revising the database categories was undertaken before the bulk of the papers were evaluated and entered into the database.

Under tier 3, where gaps in research were identified and findings were synthesized for an overview of REDD+ projects globally, the CPR principles allowed a critical evaluation of institutions of local level REDD+ projects and the related outcomes. The 15 studies reviewed, contained REDD+ projects (Table 3) spread across 14 countries: Tanzania, Papua New Guinea, Brazil, Peru, Vietnam, Mozambique, Philippines, Cameroon, Bolivia, Democratic Republic of Congo, Indonesia, Cambodia, Nepal and Ecuador as shown in Figure 2.

4. Findings and discussion

4.1. Clearly defined boundaries

The reviewed literature frequently echoed Ostrom's principles (1990) in stating that the physical delineation of community and forest boundaries is essential for REDD+ implementation. However, these boundaries were as yet largely undefined across most REDD+ project areas in selected literature, such as in Ulu Masen and Mount Cameroon sites in Indonesia and Cameroon respectively

Table 3: Geographical representation of projects in reviewed literature.

Continent	Country	Project title and location	Reference
Africa	Cameroon	Mount Cameroonian REDD+ project, Bova Bomboko, Likombe, Mapanja, Muelli; Payments for Environmental Services project, Nkolonyeng and Nomedjoh	Awono et al. 2014
	Tanzania	Angai Villages Land Forest Reserve, Mihumo and Lilombe Northern Rufiji Delta islands Carbon Forestry projects, Mshinzi and Mchele	Mustalahti et al. 2012 Beymer-Farris and Bassett 2012; Burgess et al. 2013 Resosudarmo et al. 2014
Asia	Indonesia	Ulu Masen REDD+ Project, Aceh; Ketapang Community Carbon Pool, West Kalimantan; Kalimantan Forest and Climate Partnership, Central Kalimantan; Rimba Raya Biodiversity Reserve REDD+ Project, Central Kalimantan; Katingan Peat Restoration and Conservation Project, Central Kalimantan	Leggett and Lovell 2012
	Papua New Guinea	April-Salomei Pilot REDD+ Project, Niksek (Paka), Bukapuki, Kagiru, Wagu and Bitara	
	Cambodia	Oddar Meanchey Community Forest REDD+ project, Oddar Meanchey	Pasgaard 2013
	Philippines	Climate-Relevant Modernization of Forest Policy and Piloting of REDD in the Philippines, Southern Leyte; Advancing Development of Victoria-Anepahan Communities and Ecosystem through REDD (ADVANCE REDD), Southern Palawan; Community Carbon Pools Programme, Southern Sierra Madre Mountain range; Quirino Forest Carbon Project, Quirino; Philippine Peñablanca Sustainable Reforestation Project, Peñablanca Sixteen communities* from these projects: System of Incentives for Environmental Services, Acre; Sustainable Settlements in the Amazon: the challenge of transition from family production on the frontier to a low carbon economy, Pará; Central Xingu REDD+ Pilot Program, São Félix do Xingu; Northwest Mato Grosso REDD+ Pilot Program, Northwest Mato Grosso Socio-Bosque programme, Cofan, Waorani, Awa	Lasco et al. 2013 Duchelle et al. 2014 Reed 2011
South America	Brazil Ecuador		

Table 3: (continued)

Continent	Country	Project title and location	Reference
	Peru	Belgica; Amigos; ACA Castaña; Tambopata; Piramide; Inter Andean; Manu-Amarakaeri; DRIS; MDD Amazon; Infierno; BAM Castaña – all in Madre de Dios Watershed area	Hajek et al. 2011
Africa, Asia	Mozambique, China	N'hambita Community Carbon Project, N'hambita China was considered on national level in article and therefore was omitted from review	Groom and Palmer 2012
Africa, Asia, South America	Brazil, Indonesia, Tanzania, Democratic Republic of the Congo, Bolivia, Cameroon, Peru, Nepal, Vietnam, Mozambique, Papua New Guinea	Communities* not stated in study	Murdiyarto et al. 2012
	Brazil, Cameroon, Tanzania, Indonesia and Vietnam	Field research was in 19 REDD+ project sites across the 5 countries comprising 71 villages*	Sunderlin et al. 2014
	Brazil, Cameroon, Indonesia, Tanzania, Vietnam, Peru	Findings from study was derived from 71 villages*	Larson et al. 2013

*Authors did not state names of communities and so our study is limited in identifying specific community names.

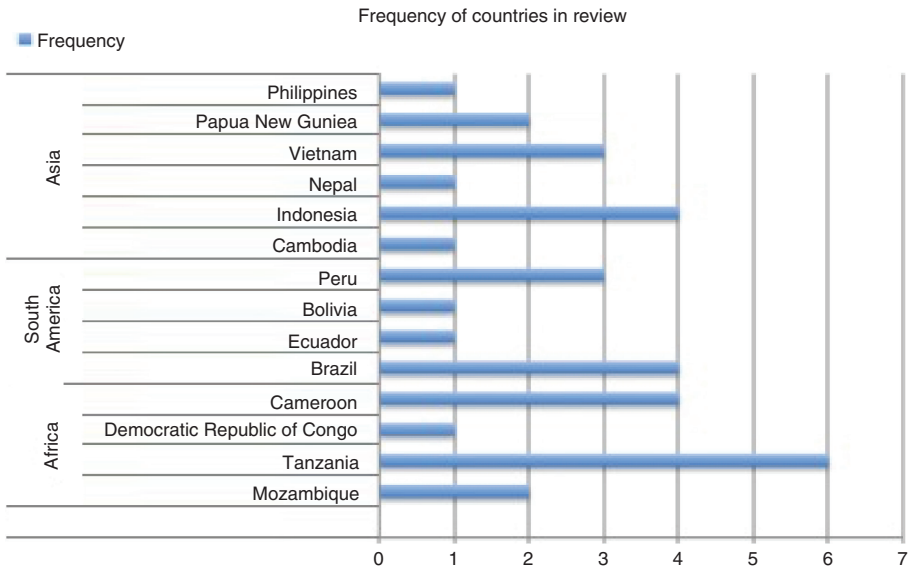


Figure 2: Country frequency in the 15 studies reviewed.

(Sunderlin et al. 2014). In addition to this physical delineation, the majority of reviewed papers regarded the specific bundles of rights articulated in tenure arrangements as another important element in resource management.

Land ownership in the project sites was revealed as either customary or statutory, with these two ownership forms commonly co-existing (Awono et al. 2014). Some studies found forestlands strictly under statutory control (*de jure*) but often with communities residing near the natural resources carrying out informal management (*de facto*). Across the selected literature on REDD+ on communal/public lands, tenure remained un-clarified in project areas. This meant that REDD+ sites in countries like Papua New Guinea, Indonesia and Cameroon are vulnerable to governments overriding customary ownership, and allocating concessions to industrial companies or private sector actors (Murdiyarso et al. 2012). Clearly, tenure security has been prominent in REDD+ discourse since its inception (Larson 2011); however, this has not often translated into progress in tenure clarification and security.

Further, 5 papers examined the right of exclusion as an element of secure tenure. These studies highlighted that communities' perception of their right to exclude did not always translate into actual ability to exclude. This is the case in the 'Central Xingu REDD+ pilot' (Brazil); 'Making REDD+ work for Communities and Forest Conservation Project' (Tanzania); and the 'Ulu Masen Project' (Indonesia), among others (Sunderlin et al. 2014). Commonly, governments distribute rights over community lands to outsiders or tend to appropriate

lands for other purposes including claims of ‘for public interest’ (Beymer-Farris and Bassett 2012; Murdiyarso et al. 2012). Having legal title documents therefore plays a key role in enhancing security of tenure (Omura 2008). Thus, communities that lack formal legal recognition of customary land rights (maintained historically through customs and preserved by local knowledge) risk having their lands confiscated by governments (Sunderlin et al. 2014). Under a REDD+ policy mechanism, where communities may have legal liability for obligations, recognized community rights and the ability to exclude outsiders are essential to ensure the reduction of carbon emissions and its permanence (Palmer 2011).

To establish a functioning REDD+, projects are working to clarify and secure tenure for forests and lands in the villages and communities in which they operate. A process mainly dominated in the locality by community mapping and boundary demarcations. However, in the case of REDD+, tenure is further fraught with uncertainties around carbon rights (Hajek et al. 2011; Duchelle et al. 2014; Sunderlin et al. 2014). Very few countries have developed carbon rights (Skutsch et al. 2013) to guide REDD+ projects. It has been argued that, to avoid conflicts, carbon rights have to be defined and the complexity around its transfer further unpacked (Palmer 2011). Even though Sunderlin et al. (2014) argue that drawing a clear distinction between carbon rights and forest tenure is essential, this distinction was not always realized in practice in the studies reviewed. For example, Indonesia’s regulatory tenure framework that guides local REDD+ projects does not separate forest tenure, land tenure, or carbon rights (Resosudarmo et al. 2014). In another vein, as identified by Larson et al. (2010) in Mexico and Costa Rica, the arrangement is to have various rights and responsibilities relevant to carbon management and benefits within the concept of stewardship for forest users, as opposed to ownership.

Power dynamics, actor interests and demands, entrenched institutional systems and financial rewards associated with REDD+, will most certainly influence the processes of defining carbon rights (Angelsen et al. 2012). Contained within the process, are the possible threats of elite capture, conflicts and inequity (Larson 2011). Economic and political interests have in some cases, such as in Indonesia and Papua New Guinea, promoted favouritism among state officials and industrial actors (Murdiyarso et al. 2012; Resosudarmo et al. 2014). These informal relationships might affect REDD+ communities in ways not yet understood, and therefore need to be further researched.

4.2. Congruence between resource appropriation, rules and local needs

Eleven studies revealed a broad range of livelihood activities that indigenous peoples or local forest communities engaged in, including agriculture (shifting cultivation), charcoal production, the rearing of livestock, gathering of fuel wood and collecting non-timber forest products (for trade and subsistence). In some other places like Northwest Mato Grosso and Acre in Brazil, community livelihoods were fishing, hunting, wage labour and business (Duchelle et al. 2014).

The majority of these livelihoods interact with forest resources and therefore raise issues regarding their congruence with REDD+. Though the literature revealed evidence of indigenous peoples and local communities' reliance on land and forests for their daily activities and livelihoods, it failed to demonstrate considerable evidence of successful integration of REDD+ carbon storage objectives with the livelihood objectives of communities.

The REDD+ strategy for each project area requires giving attention to community livelihoods and their impact on land use and carbon emissions. Considerable REDD+ actions to safeguard and promote community livelihoods alongside emission reductions are expected to decrease community vulnerability to climate change, whereas community vulnerability will be increased should REDD+ negatively impact their livelihoods. REDD+ requires new and conscious thinking on how to combine the objectives of carbon emission reduction with community needs (Somorin et al. 2012), as synergies will not necessarily develop naturally (Cerbu et al. 2013).

Some of the selected REDD+ projects engaged with certification schemes and international standards, including: Plan Vivo (N'hambita in Mozambique); Climate, Community and Biodiversity Alliance (CCBA) (April-Salomei in PNG); and the Verified Carbon Standards (VCS) (Cusco/Madre de Dios in Peru). In contrast, REDD+ projects in some countries such as Cameroon followed national implementation rules and guidelines formed via multi-stakeholder platforms at ministerial level. Though some projects adopt CCBA, VCS and Plan Vivo, it was not clear if these guidelines represent fair and legitimate rules in the communities within which they are applied (Gautam and Shivakoti 2005). As externally designed rules, there is a likelihood of negative consequences if these guidelines are imposed without effort to match to local customs and to fit in with existing livelihood strategies (Cox et al. 2010). The specific rules regarding resource extraction and whether REDD+ project designs accounted for congruence between usage and provision rules with respect to local conditions and needs were inconclusive from the review.

The selected literature further revealed that certain governance issues affected the congruence between the state of the resource and the rules and standards needed to ensure improved forest cover. Major problems included corruption; elite capture of resources; entrenched structures and systems that enforce inequity; and economic interests driving unsustainable timber exploitation. It must therefore be recognised that power relations can lead to the co-opting of local decisions and processes and marginalization of some community members (Di Gregorio et al. 2008; Eriksen et al. 2015).

4.3. Decisions via collective choice arrangements

To analyze how decisions are made, we first examined information sharing approaches; studies indicated a suite of approaches ranging from meetings and training to capacity building workshops. Sunderlin et al. (2014) found in some

cases that private project implementers did not divulge full information on REDD+ to forest-based communities. This was the case in 6 project sites (3 in Brazil and 3 in Indonesia) where the implementers totally refrained from mentioning REDD+ when they engaged communities. In addition, Free Prior and Informed Consent (FPIC) under the United Nations Declaration on Indigenous Peoples Rights (UNDRIP), which involves providing full and accurate information in a timely manner to communities to enable decisions on a project, is largely limited in the REDD+ projects reviewed. There is substantial evidence that some communities face inequity in engagement based on the limited, and in some cases lack of, REDD+ knowledge. Access to knowledge is one approach to reducing the inequity and resource capture gap (Berkes 2009). However, based on findings, we note that information-sharing approaches in REDD+ need review.

In most of the countries featured in the review, findings revealed that project developers dominate decision-making and project design. For example, in Groom and Palmer's (2012) research on REDD+ projects in N'hambita, Mozambique, project developers had already decided the generic design of the projects before subjecting the design to community inputs to tweak it to fit local circumstances. The engagement processes often do not portray participatory outcomes, as evidenced by Lasco et al.'s (2013) Philippines' Visayas and Luzon Island projects. In Leggett and Lovell's (2012) study of April-Salomei in Papua New Guinea, though discussions had been participatory, inputs to shape decisions and designs were selectively chosen by the project implementers external to the communities. They noted only positive outcomes were reflected whereas negative opinions were ignored. In addition, the language of engagement and contract documents were in some cases not tailored to local languages of the communities. This lack of sensitivity to local situations and practices such as non-disclosure of full information to communities, entrench inequity. The experience of decision making in the 12 REDD+ projects across Peru was reported to be different however, as project leads were indigenous peoples, grassroots NGOs, and forest concessionaires (Hajek et al. 2011).

Though engaging communities catalyses a working knowledge of decisions and procedures, and increases ownership, there is an outstanding question of what constitutes adequate engagement in REDD+. It has been argued that having a stakeholder-agreed minimum standard for participating in REDD+ project levels will foster a collective decision making approach for effective management of relationships between various stakeholders (Berkes 2009). These minimum standards can include the minimum time needed to allow communities to digest, absorb and form their own decisions and positions to feedback to the process.

4.4. Effective monitoring

Elements monitored across REDD+ projects in selected literature differed; they included forest and tree exploitation, carbon, programme activities and stakeholder engagement. In the Khasi and Gaw Hills pilot projects in India, provisions and

proposals were made to monitor carbon and biodiversity benefits. The monitoring approaches identified in this review range from strict licensing systems based, for example, on quota allocation, to the use of remote sensing and satellites. Other processes include forest inventory and observations via patrol systems.

There were recognized risks of excluding forest-based communities or indigenous peoples from monitoring systems. This is linked in literature to elite capture of resources and processes as seen in the REDD+ projects in Papua New Guinea, Indonesia and Vietnam (Murdiyarso et al. 2012), resulting in disempowerment and marginalization of locals. With respect to the principle, we found that studies largely reported monitoring of the resource condition and lacked any mention of the monitoring of behaviour of users by users. For a successful community based natural resource management, Cox et al. (2010) posit the importance of both social monitoring and environmental monitoring. There was also a lack of focus on the essence of a feedback system for the monitoring framework in selected literature, except Pasgaard (2013) in the social-dimensioned study on Oddar-Meanchey (Cambodia), who cursorily broached the subject.

To establish the effectiveness, efficiency and equity of REDD+, it can be argued that monitoring should extend beyond carbon to costs, procedural and socio-economic outcomes. Other arguments have been levelled to integrate REDD+ impacts on biodiversity in the monitoring framework (Gardner et al. 2012) and the performance of safeguards. Monitoring safeguards is currently lacking in on-going projects and, for those kicking off, plans to monitor safeguards were not visible (Pasgaard 2013; Somorin et al. 2014). These safeguard-monitoring systems can rope in a monitoring framework for REDD+ co-benefits (Somorin et al. 2014). Safeguards in the review comprised respecting the rights of forest-dependent communities (access, participation, Free Prior Informed Consent); biodiversity protection/rights of nature; benefits sharing (equity); recognizing indigenous knowledge and customs; and ensuring permanence. As countries are increasingly moving from projects towards jurisdictional and national level programmatic approaches (see Ravikumar et al. 2015), communities may not be engaged in monitoring since this is not a UNFCCC requirement for carbon or safeguard measurements. However, it is noted that there is a growing consensus amongst practitioners that communities adequately trained for monitoring can produce data comparable in quality to data produced by professionals (Fry 2011).

4.5. Graduated sanctions and punishments for violations

The process of determining sanctions and the actor(s) involved in such processes were not tackled in any of the literature reviewed. The various studies were also silent on the forms of sanctions existing in various projects, except Resosudarmo et al.'s (2014) study of REDD+ in Indonesian villages, in which he reports sanction forms including jail time, compensation fines, confiscation, oral social disapproval and physical punishments.

To enhance resource governance and management including rule adherence, sanctions and punishments are essential for effective forest institutions (Mehring et al. 2011). However, from the REDD+ projects reviewed, we do not know what sanctions exist, how they came to exist or the impact they have on communities. Violations of natural resource rules vary in type and magnitude; thus, according to the Commons literature, sanctions have to be graduated (Ostrom 1990). First time violations must correspond to lesser sanctions whilst repeated offences attract steeper sanctions. Sanctions also have to correspond to the magnitude of the violations. Pertinent questions include: How can sanctions for violations be introduced and by whom? How should a system decide what sanctions correspond to what violations and to what degree? Mehring et al. (2011) found that implementation of state driven formal rules were not effective in the past. Therefore such a process requires buy-in from local people as sanctioning systems and sanctions must fit their circumstances, culture and norms (Mehring et al. 2011; Ramcilovic-Suominen and Hansen 2012). Likewise, it is key to consider what sanctions under REDD+ means for community cohesion.

4.6. Low cost and easy-to-access conflict resolution mechanism

The need for a conflict resolution mechanism in REDD+ implementation was discussed by 4 of the 15 of the studies reviewed. It was evident that the current state of un-clarified tenure across global REDD+ project sites was seen as one of the first threats of conflict arising within REDD+. Even where land tenure is clarified and secured, conflict resolution mechanisms are necessary to ensure regularized tenure is sustained (Duchelle et al. 2014).

According to Ostrom's principles, conflicts and contentions require fair and just systems of adjudication so that they do not aggravate and threaten REDD+ permanence. The selected literature revealed that little attention has been paid to REDD+ conflict resolution mechanisms. Therefore according to these principles, access to grievance redress may be essential at the lowest level of REDD+ implementation to avoid bias and conflict of interest. It should in addition, be accessible and inexpensive for aggrieved actors to seek redress (Ostrom 1990). Seeking redress requires a transparent and public process that specifies how and where appeals of dissatisfied parties must be channelled.

4.7. Right of resource appropriators to self-govern and to benefit

Four of the selected articles examined communities' collective ability to organize under REDD+. In the study of Northern Rufiji Delta Islands by Beymer-Farris and Bassett (2012), communities were reported to have collectively worked together and had historically opposed outside influences. In Waorani, Cofan and Awa (Ecuador), distrust for top-level indigenous leaders suspected to align with government and other special interests, led to a disintegration of collective views and actions of forest-based communities for REDD+. In addition, for some communities, members were more loyal to families and clans than the community

as a whole, and this affected their self-governance for collective action (Reed 2011).

To function collectively, some trust in allegiance to community aspirations or goals plays a big part (Reed 2008). A stronger tie (cultural homogeneity) amongst community members is a pre-requisite to collective functioning and sustainability (Bardhan and Dayton-Johnson 2002; McManners 2014). Research on the extent to which trust, or the lack of it, will impact REDD+ success in meeting its objectives and why some communities foster collective action and others do not, may help to foster greater understanding of REDD+. In classic forest management, the size of the community has been indicated to have importance in the success of collective action (Agrawal 2000).

In the Waorani, Cofan and Awa (Ecuador) study, there was a *Confederación de Nacionalidades Indígenas del Ecuador* network that indigenous communities had ceased to recognize and use as their mouthpiece. Unlike the foregoing case where a coalition existed but lost legitimacy, Somorin et al. (2014) found the reverse in Cameroon where a new network had been formed and was garnering support from the wider community. In Awa and Akok areas of Cameroon, Cerbu et al. (2013) identified various groups, and individuals as members of one or more groups. There was a farmer association group, which was particularly well organized and effective in decision-making. Literature on Tanzania disclosed that 13 villages had formed a collective body called MUHIMA for forest management but which recognizably would affect REDD+ (Mustalahti et al. 2012), whilst in Ecuador, Reed (2011) found that organized groups experienced conflicts due to different philosophical viewpoints of village elders' interests and local reality demands.

On the subject of community benefits, the selected literature treated REDD+ benefits as the financial assistance to undertake REDD+ readiness and the payments to be made for delivering results. Results based benefits ranged from community livelihood programmes and enterprise and infrastructure development (Visayas and Luzon, Philippines), to agricultural systems diversification (Awa and Akok, Cameroon) and financial payments (Cofan, Waorani, and Awa, Ecuador). What remained scanty and much of which was not clear in the review was who the recipients of REDD+ benefits were. In some cases such as the Cofan, Waorani, and Awa study, communities were required to present an investment plan on the communal use of benefits (Reed 2011), whereas in N'hambita in Mozambique, performance payments were made individually to participating households with a portion of benefits carved out for purposes that benefited the whole community (Groom and Palmer 2012).

The review identified that deciding who benefits, what they benefit from, and how the benefits get to them, are all outstanding issues that need to be fleshed out in most REDD+ countries that are implementing projects.

4.8. Organized rules and enforcement via nested enterprises

Eight out of 15 papers showed evidence of a link between project level and national level REDD+ activities. Often, a national framework or policy strategy shaped the

form and activities of REDD+ at all levels. There was evidence of nested governance arrangements across various cases and these were divided between the national, regional and community level. REDD+ nesting in the selected literature was clearly vertical (e.g. between user groups and government authorities) with limited mention of horizontal nesting (e.g. among user groups) (Cox et al. 2010). The nature of REDD+ as a mechanism emanating from higher levels of global environmental governance causes implementation to rely on nested approaches. For instance, changing local interactions with forests via REDD+ projects is reflected in the national level reform of policies and strategies to rectify unsustainable timber extraction and cross-sectoral policy conflicts on land use (Murdiyarso et al. 2012).

Four studies highlighted national REDD+ committees that were comprised of various stakeholders and were mandated to make decisions. In some cases, there were inter-ministerial REDD+ committees that fostered coordination amongst sector ministries and agencies. None of the studies presented clear lines of responsibility and reporting for the REDD+ elements in their cases. A nested approach allows the determination of spaces for reform on practical issues that require policy backing at the national level.

5. Conclusion

Using a systematic review approach, this paper contributes to our understanding of how REDD+ project-level initiatives implemented on community owned or public lands conform to Ostrom's (1990) principles for successful collective action. This revealed many challenges across countries and world regions.

We found, for instance, that tenure clarity and security, including carbon rights, is high on the REDD+ discourse but pragmatically has seen very little headway at implementation levels. While communities were engaged in the REDD+ projects, their engagement was often in an ad-hoc fashion. Decisions were taken before communities were consulted to gauge their reaction. Many of the REDD+ projects examined under this review demonstrated a lack of FPIC, and the withholding of information by project implementers in a bid to manage community expectations.

Other gaps in REDD+ on the ground include the elite capture of resources and corruption, which frequently pre-date the start of REDD+ projects. There has frequently been inadequate benefit-distribution, often exacerbated by a lack of clarity in project design regarding who is expected to benefit, what they are to benefit and how they will benefit.

The systematic review further allowed this paper to highlight the areas in need of further research regarding the successful implementation of the REDD+ mechanism. The gaps in research that were identified are:

- There was limited research that clearly explained how the design of REDD+ projects on community forests and public lands addressed

community involvement in decision-making. Building on this, research is required to establish both inter-stakeholder and intra-community social impacts of REDD+ including any impacts that community heterogeneity, such as gender, may have on REDD+ implementation, and vice versa.

- The review indicates that implementing REDD+ involves multi-stakeholder, multi-institutional and various governance approaches at nested levels. As realized, multi stakeholder platforms play a major role in the REDD+ process. However certain key elements such as conflict resolution mechanisms and benefit sharing systems are key issues that need to be unpacked to understand how these will impact forest-based communities and REDD+ carbon storage objectives.
- Literature is scant on the rules for governing resource use in REDD+ projects, how the rules were formed, how often they are renewed and what leads to their review.
- Research into sanctions and punishments for violations needs to be carried out to establish how sanctions are determined, what sanctions exist, who imposes sanctions and what sanctions mean for community cohesion.

Using Ostrom's design principles proved useful in understanding the gaps, both on the ground and in the research, in the context of REDD+ projects. Many of these gaps may be similar to those found in the practice of community forestry more generally. But nevertheless, further research is needed on how to best address these gaps, if REDD+ is to be used as a tool to support community forestry.

Available information in some studies was insufficient to examine the relevance of all principles as a lens for evaluating empirical evidence on REDD+ implementation. For instance, principles 5, 6 and 8 were not well elaborated in the literature reviewed. While clearly much more could be done to explore Ostrom's principles, there are also limits to the degree to which this framework can explain all the issues, barriers and opportunities to communities from REDD+. In addition, it is important to consider other complementary frameworks, such as the 'equity framework' (see McDermott et al. 2013), or the 'justice framework' (see Sikor et al. 2010) to build upon an understanding of contextual, procedural and distributive aspects of REDD+ at community, national and regional scales.

This paper focused on projects at the community level. In future, it is highly likely that REDD+ projects will be required to fit within a more scaled-up and coordinated national REDD+ structure. From this study we conclude that Ostrom's principles contribute an important starting point for understanding local institutions of REDD+ governance, which can then be used to inform the scaling up of REDD+. While the UNFCCC focuses on the reporting and achievement of both carbon reductions and safeguards implementation at the national level, the success of REDD+ implementation rests ultimately with its ability to engage effectively with the local actors shaping its enactment on the ground.

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