Factors of success in community forest conservation

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Abstract
Drawing on structured interviews of 29 conservation practitioners with first-hand experience working with successful community forest conservation projects in eight countries around the world, this article explores how context influences the importance of Mancur Olson's five requisites for collective action, and Elinor Ostrom's eight design principles for effective common-pool resource management. Results suggest that Olson was correct that social cohesion is a common attribute of successful community forest management efforts. But the survey also suggests that it is shared identity that is most the important contributor to cohesion and that this can occur largely absent of regular, positive face-to-face interactions as Olson suggests. Interviews also show that all eight of Ostrom's design principles are manifest by successful community forest conservation efforts. Although recognition of a community rights to self-determination was reported to be essential, it was also considered insufficient without the timely and competent support of national authorities to help communities effectively exercise their rights when faced with threats from more economically and politically powerful external actors.

KEYWORDS
collective action, community forest conservation, conservation, resource governance

1 | INTRODUCTION

This article explores how relevant predictions from two theories (Olson, 1965; Ostrom, 1990) that underpin, either implicitly or explicitly, the design and implementation of Community Based Conservation (CBC) efforts were, in practice.

CBC grew out of observations by Graham Child (Child, 1970; Child, 1982), Rowan Martin (Martin, 1986), Dale Lewis (Lewis & Carter, 1993), and others in Zimbabwe and Zambia in the early 1980s that: (a) wildlife populations were declining rapidly from overhunting, (b) that National Parks managed by state agencies were insufficient to halt the decline, and that (c) local communities saw wildlife as despoilers of their crops and livestock and as an affordable and accessible source of food and income.

Drawing implicitly on the scientific method, they took these observations and posed a question: what would need to change to provide local communities with an incentive to conserve, not deplete wildlife? This in turn led to a testable hypothesis, that devolving to local communities the authority to manage and tangibly benefit from the sustainable use of wildlife would provide the incentive communities needed to conserve wildlife. Establishment of CAMPFIRE in Zimbabwe and ADMADE in Zambia were tests of the prediction based on this hypothesis.
At that time, the theory underlying this hypothesis was the principle of subsidiarity – a tenet of Catholic social thought that postulated that matters ought to be handled by the smallest, lowest, or least centralized competent authority (Kenney, 1955; Utz, 1958).

With the onset of CBC in Southern Africa, Marshall Murphree and his colleagues at the Center for Applied Social Sciences at the University of Zimbabwe began to study what governance systems communities and government agencies would need to manage wildlife sustainably, in ways that contributed to community wellbeing and the national economy, as well as wildlife conservation (Murphree, 1990).

Similar decentralization efforts were being launched in Nepal, with the passage of the community forestry policy, in 1976, and early investment by bilateral donors (Dressler et al., 2010).

At Indiana University Vincent and Elinor Ostrom, in the late 1960s and early 70s, were exploring how public goods could be most effectively delivered and the role that collective action and public choice played (Sabetti & Aligica, 2014). Contemporaneously, Mancur Olson published his first book “The Logic of Collective Action: Public Goods and the Theory of Groups” which like the Ostrom’s looked at what factors would enable individuals to come together to solve a common problem (Olson, 1965). But neither at that time were looking specifically at community-based conservation.

Today, conservation organizations draw implicitly (at times explicitly) on the foundation laid by Child, Martin, Lewis, and others, the best practice guidance distilled by Murphree and his colleagues, and the theoretic underpinnings provided by Ostrom and Olson to design, implement and adaptively manage CBC projects and programs.

Arguably, the most influential theoreticians to influence CBC were Elinor Ostrom and her intellectual followers (Ostrom, 1990; Ostrom, 1998; Gibson, Ostrom, & McKean, 2000) who looked for the factors likely to be requisites for groups of people to sustainably manage natural resources that are shared and have a finite supply, and that would be costly but not impossible to exclude individuals from using (i.e., a common good or common pool resource that in economic terms is nonexcludable and rivalrous). The other, which is less often explicitly acknowledged even though it is a prerequisite for Ostrom’s common-pool resource management, is collective action theory. This was first enunciated by Mancur Lloyd Olson, Jr. (Olson, 1965) and focused on the conditions that need to be met for individuals and families to act in concert as a cohesive community, to solve a common problem.

Olson’s collective action theory asks two basic questions:

1. Why would individuals or families trust one another enough to agree to work together to solve a common problem? and
2. What would prevent individuals or families reaping the benefits without investing the effort by simply “free-riding” on others hard work (i.e., the Olson Effect)?

Olson answers these questions by arguing that social cohesion is essential for collective action and that it is an outcome of:

1. Knowing one another,
2. Interacting frequently,
3. Getting help from one another,
4. Trusting neighbors, and
5. Feeling that they belong to a group or neighborhood with a shared identity.

Absent social cohesion, collective action theory argues, groups of people will never coalesce into a community that is willing to work together and invest their time to solve a shared problem (Knoke, 2019; Sen, 2018). For conservation organizations, Olson’s theory strongly suggests that lack of social cohesion within a community likely undermines or precludes efforts to promote collective action and successful and durable CBC (Gutiérrez, Hilborn, & Defeo, 2011).

If a group of people have sufficient social cohesion to be willing to cooperate and take collective action to solve a common resource conservation problem, they must then be able to decide how they will manage the resources they care about and enforce these decisions (Gibson et al., 2000; Ostrom, 1990).

Ostrom identified eight design principles of effective community-based common-pool resource management:

1. Territorial or resource access rights are clearly defined
2. Rules for using common resources are adapted to local ecological and social conditions
3. Most resource users participate in the process to decide who can use how much of a resource
4. Effective monitoring of resources and compliance with use rules is undertaken by people who are part of or are accountable to the users
5. Graduated sanctions are imposed on resource users who violate community rules
6. Mechanisms of conflict resolution are affordable and available to all
7. The community’s right of self-determination is recognized by higher-level authorities and
8. When common-pool resources span large areas, governance occurs through a nested structure of authority where multiple communities are at the base level.

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8. When common-pool resources span large areas, governance occurs through a nested structure of authority where multiple communities are at the base level.
Although these two theories have informed conservation practice, it is primarily Ostrom’s design principles that have been studied to ascertain if they are indeed all requisites for successful and durable conservation of the commons by communities (Cox, Arnold, & Tomás, 2010; Gari, Newton, Icely, & Delgado-Serrano, 2017). This is interesting because concerns about social cohesion have dissuaded investment in CBC initiatives in conflict zones, areas with large numbers of displaced people and areas that have experienced disruptions associated with modernization (Brandon, 1995). Although Olson’s theories were acknowledged and incorporated into Ostrom’s thinking on common pool resource management (Ostrom, 1990; Ostrom, 2003) there has been far less effort in assessing the importance of social cohesion as a requisite for effective CBC. Nor has the conservation community determined under what conditions Olson’s theorized requisites might be desirable, but not essential conditions.

The overall wisdom of Ostrom’s design principles and their distillation into authority, capacity, and power (Wilkie, Wieland, & Detoeuf, 2015) has been demonstrated in numerous examples. However, although we know how the presence or absence of different principles has been associated with how well, or not, common pool resource management regimes have worked, we have not invested much in exploring if all eight of them are equally important in all contexts, or if some might be more important than others, at least in certain situations.

In the last 50 years 6,500 authors have published over 3,800 articles on the commons (van Laerhoven, Schoon, & Villamayor-Tomas, 2020), almost all have been short term case studies (Persha, Agrawal, & Chhatre, 2011; Potete & Ostrom, 2008). Others have used meta-analyses of published literature (Baynes, Herbohn, Smith, Fisher, & Bray, 2015; Gari et al., 2017; Pagdee, Y-s, & Daugherty, 2006) to better understand the ecological, social and governance factors that may contribute to the success of community based forestry, but these did not explicitly explore the importance of the Olson and Ostrom principles. Still others, have examined the role that tenure may play in the effectiveness of community based forestry (Robinson et al., 2018; Seymour, La Vina, & Hite, 2014; Stickler, Huntington, Haflett, Petrova, & Bouvier, 2017), and how multi-level interaction and collaboration (Berkes, 2007), cultural context (Waylen, Fischer, McGowan, Thirgood, & Milner-Gulland, 2010) and project design and capacity building influence attitudinal, behavioral, ecological, and economic outcomes of CBC (Brooks, Waylen, & Mulder, 2013).

This is not the first study to explore the importance of the Olson and Ostrom principles. However, we argue that mining the expert knowledge of conservation practitioners whose careers have focused on supporting community organizations to attain the knowledge, capacity and power they need to effectively governance access to and use of their forests can provide valuable insights.

2 | METHODS

This study set out to explore how relevant Olson’s and Ostrom’s predictions for collective action and effective natural resource governance were in practice. Results were based on semstructured interviews of a non-random, “chain-referral” or “snowball” sample of 29 practitioners who have spent their careers supporting communities to strengthen their natural resource governance and have first-hand knowledge of the factors that appear to determine the success or failure of community forest conservation (CFC) projects located in eight countries around the world. The size of our sample was limited by the lengthy questionnaire, which consisted of 129 possible questions. The length was an outcome of attempting to explore the relevance of all aspects of social cohesion and common pool resource governance identified by Olson and Ostrom, respectively (Table S1).

The study is part of a larger collaborative effort of the Alliance for Conservation Evidence and Sustainability (ACES) to improve conservation practice by making explicit and testing its theoretical underpinnings. Other ACES partners have conducted a complimentary study focusing on issues of replicating and scaling up successful CBC experiences, by looking into the predictions of Everett Rogers (Rogers, 2010) about how innovations in farming, health care and other industries diffuse, and whether and how these predcitions are relevant when applied to CBC (Mascia & Mills, 2018; Mills et al., 2019).

The practitioners provided information on CFC initiatives in eight countries (Table 1) that they regarded as successful, with which they were personally familiar, and which have been in operation long enough to have generated internal documentation to corroborate the successful aspects of the programs. These included contributing substantially to maintaining the integrity of forest ecosystems and, in so doing, making positive contributions to the quality of life of the people living in the participating communities.

We focused on successful projects, because absence of an Olson or Ostrom factor unequivocally indicates that it did not cause the project to fail and was thus not essential in that setting. Whereas, in an unsuccessful project, the importance of a factor is ambiguous as its absence could be interpreted either as contributing to lack of success or it could simply have been irrelevant to project outcomes (cf., Cox et al., 2010; Gari et al., 2017). The resulting
sample of initiatives included in our study ranged in size from a Community Forest User Group (CFUG), in Nepal, where about 190 people are managing a forest of 61 ha, to indigenous territorial organizations in northwestern Bolivia that represent over 16,000 people managing 1.4 million hectares (Table 2).

We included CFCs where, although forest conservation is an outcome, the forest itself may not be the primary focus of management activities. For example, in the Tacana Indigenous Territory, in northwestern Bolivia, sustainable forestry is practiced in areas zoned for that purpose. However, the Tacana carry out a number of economic activities based on the sustainable use of forest and aquatic ecosystems, which are guided by a territorial management plan, with the result that deforestation is lower in the indigenous territory than in any other jurisdiction in the region, except for Madidi National Park (Painter, Siles, Reinaga, & Wallace, 2013).

The responses to the interview formed a body of text, on which we conducted a content analysis based on deductive coding (Bernard & Ryan, 1998). Deductive coding is used in confirmatory research, where the categories of information have already been defined. In this case, the questionnaire used for the semi-structured interviews was organized around the five elements that Olson found essential for social cohesion and Ostrom’s eight design principles of community-based common pool resource management.

Wilkie and Painter coded the texts generated by the interviews, organizing the responses based on their

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**TABLE 1** Locations of interviews conducted

| Country                               | Locations of Community-Managed Areas                                                      | No. of people interviewed |
|---------------------------------------|------------------------------------------------------------------------------------------------|---------------------------|
| Bolivia                               | Northwestern Bolivia, Tacana, Pílon Lajas, Lecos Apolo, and Lecos Larecaja Indigenous Territories | 6                         |
| Cambodia                              | Northern Plains, Preah Vihear, and Modolkiri Provinces                                       | 2                         |
| Democratic Republic of Congo          | Ituri Forest Community Conservation Concessions                                             | 1                         |
| Guatemala                             | Maya Biosphere Reserve                                                                       | 2                         |
| Guatemala                             | Makira Forest Project                                                                       | 6                         |
| Nepal                                 | Madhuban and Godawari Municipalities                                                        | 4                         |
| Papua New Guinea                      | Bismarck Forest Corridor and Manus Island                                                   | 4                         |
| Peru                                  | Tamshiyacu Tahuayo Regional Community Conservation Area                                      | 4                         |
| Total interviews                      |                                                                                              | 29                        |

**TABLE 2** Size of CFC initiatives surveyed

| Country                    | Has. under mgmt. | No. of villages | Population  |
|----------------------------|------------------|-----------------|-------------|
| Bolivia                    | 1,400,000a       | 105             | 16,273      |
| Cambodia                   | 450,000          | 28              | NA          |
| DRCb                       | 49,000           | 28              | 7,094       |
| Guatemala                  | 83,558           | 1               | 800c        |
| Madagascar                 | 342,735          | 300             | 120,000     |
| Nepal/Madhuban CFUGd       | 61               | 1               | 190         |
| Nepal/Santaneshowor CFUG   | 127              | 1               | 1,143       |
| Peru                       | 420,080          | 13              | 1,300d      |
| PNG/Bismarck Forest Corridor| 6,642          | 14              | 4,500       |
| PNG/Manus Island            | 43,000           | 9               | 3,800       |

aRefers to total area of titled indigenous lands in landscape. Includes 4 indigenous territories and 1 smallholder settlement area.
bNumbers are sums of two neighboring Community Forest Concessions.
cTotal population using the resource. About 260 are formal CBO members.
dNationally, there are about 2.2 million hectares under CFC, in Nepal, with about 10 million people (2.9 million households) participating in Community Forest User Groups (CFUG).
eTotal people using the resource. About 600 people participate actively in governance activities.
relevance to these 13 categories of information. Wilkie focused on the elements of social cohesion and Painter on common pool resource management. We then reviewed one another’s coding to confirm that we agreed on how text had been assigned. The same text segments were often assigned to multiple categories.

This approach means that our results are subject to two types of confirmation bias. First, because both the questionnaire and the categories to which we assigned text were organized around features identified by Olson and Ostrom, a major factor influencing the success of the CFCs that did not fit into their respective constructs would not necessarily have been identified. However, because the ACES project had already spent 2 years reviewing CBC literature, leading to our focus on Olson and Ostrom, we sought to assess the relative importance of the factors they identified in particular contexts, not evaluate their overall significance for CFCs.

Second, because we assigned text segments to multiple categories and the same text segment was often associated with both Olson and Ostrom, the analysis does not allow us to differentiate between Olson and Ostrom in terms of their relative importance in shaping CFC success. The results thus confirm our existing view that both are important, based on the previous work of ACES, which associates Olson and social cohesion with the factors that influence people’s willingness to organize themselves to cooperate in solving a common problem and Ostrom with the institutional features that influence the success of such initiatives. Thus, our results take the general importance of Olson and Ostrom as givens and focus on the circumstances that cause one or another of the factors they identified to be especially important in particular contexts.

3 | RESULTS

3.1 | Olson’s determinants of social cohesion

3.1.1 | Community size, dispersion, and level of interpersonal interaction (requisites 1 and 2)

Most of the CFC examples in our study involve multiple settlements distributed over wide areas. For example, the 2,600 people that reside in the Tacana Indigenous Territory, in Bolivia, live in 20 settlements dispersed over 370,000 ha of their traditional territory. Similarly, there are about 1,300 people living in 13 settlements over 420,000 ha within Peru’s Tamshiyacu Tahuayo Regional Community Conservation Area (TTRCCA). In Madagascar 120,000 people live in 300 villages aggregated into 75 community administrative units (COBA). In contrast all members of the community in both the Guatemala and Nepal cases are resident in one village.

Individual settlements typically had relatively small resident populations (100–250), although in Madagascar the settlements were on average 400 people, and the village of Uaxactun, in Guatemala, had just over 800 residents, in 2018. Dunbar and Sosis (2018) note that in small scale agricultural economies groups of 50, 150, and 500 people appear to be most socially cohesive and durable. Other than Uaxactun, the settlements within this study fall within that range.

In all cases, residents within an individual settlement know one another, because members interact regularly or are related by birth or marriage. Many villages are effectively extended families. Olson’s prediction of stable settlement/village membership is not, however, true across all study sites. For example, there is increasing population instability within the T’simane settlements, in Bolivia, as youth are increasingly out-migrating to the cities. Many T’simane are also more frequently moving the location of their longhouses where everyone lives under one roof. It is unclear if this alters intervillage interaction, although the experts interviewed were concerned that it might. In Cambodia there are relatively high levels of in and out migration. Whereas, in DRC, PNG, and Bolivia in municipalities involved in managing the TTRCCA convene four times a year for meetings of the area’s management committee. In Cambodia and Madagascar villages get together occasionally for traditional festivals and religious celebrations.

3.1.2 | Interfamily collaboration and trust (requisites 3 and 4)

Olson (1965) argues that for groups of related or unrelated individuals to agree to work together to solve a common problem they must trust one another and have a sense that their actions and investments will be reciprocated. To assess interfamily trust and willingness to collaborate, we asked about whether people within a village help one another, lend items to one another, can leave possessions unattended without fear that they will be
stolen, and have a belief that neighbors will offer help if they need assistance. We also asked whether people from different villages ever work together.

Across all sites families within settlements help one another, most commonly to build houses, and harvest fields. Families in PNG work together to repair roads and build school buildings. In DRC families often help one another with food and labor during periods of mourning. Although families in Uaxactún, in Guatemala, do help one another it is not a prominent part of village life, because work beyond the level of households is organized around extended family groups, not the village. Families across study sites all felt that their neighbors will help them if they need assistance. But, maybe as a consequence of travel costs between dispersed villages, families from multiple villages seldom came together to work on a common project.

Families lend other families their possessions and expect those to be returned. In the case of DRC, the expectation is that something will be returned only when the lender asks for it. At some sites people were able to leave possessions lying around without fear of them being taken by others, while in others theft was more likely and possessions were guarded. The DRC interviewee associated this difference with the presence of large numbers of migrants escaping violence elsewhere that have arrived in some sites. In PNG, although families lend one another tools and often help others with field work, it is not uncommon that families will steal from other families, and even sell community land to outsiders. The three people interviewed about the Bismark Forest Corridor associated both kinds of stealing with people’s desperation to have access to cash, while the single interviewee working on Manus Island added that people living on the coast rarely venture into clan forest lands located in the interior. As a result, they may not feel strongly that land sold to outsiders is being stolen from them. In Madagascar people, in the past, were able to leave possessions unguarded without fear that they would be taken without permission, but fear of theft has increased as income and wealth inequality has risen in association with the cultivated vanilla export boom. All six of the people interviewed about Madagascar associated increased crime as a negative consequence of increased wealth inequality, while recognizing that greater wealth has also brought positive changes.

Evidence from this study also suggests that CFC can succeed even in settings characterized by high levels of mistrust and conflict. For example, in Cambodia, 13 villages, with populations ranging between 80 and 350 people, manage community protected areas ranging between 500 and 3,000 ha in size. Within those communities, families also collaborate to produce and sell high-quality, certified Wildlife Friendly, Ibis Rice. Both interviewees discussed how work was complicated by the fact that, among the residents of the villages are people who were on opposing sides during the Cambodian genocide (1975–1979) and mutual mistrust remains high. However, both groups are threatened by efforts of wealthy outsiders and corporations, often with ties to the military, to encroach on village lands. The village governance structures use very regular community meetings and resource-use discussions to promote transparency and avoid and resolve interfamily conflict. These governance groups, which are linked to the Ministry of Environment through the community protected areas, have proven fairly effective in beating back these outsider attempts at land-grabbing and all villagers perceive it as being in their interest to support and strengthen community protected lands.

3.1.3 | Interfamily and intervillage shared sense of community identity (requisite 5)

Regardless of whether a community is composed of a single village or numerous villages scattered over a large landscape, all 29 people interviewed mentioned shared identity as a factor motivating people to work together. The basis of shared identity varies considerably. For example, both interviewees involved in the Cambodian case, mentioned above, agreed that the necessity of addressing encroachment by outsiders creates bonds of collaboration between groups that do not share other sources of solidarity. In Bolivia, on the other hand, all six interviewees noted that all the CFC communities included in the study have a deep sense of shared identity as Indigenous Peoples, which is founded on common livelihood and cultural practices and shared claims over territory and natural resources.

In DRC, people recognize ethnic identities (Efe, Lese, Mbuti, Bira, etc.), clan identities (extended families that live together – Andibundu, Andikeke, etc.) and exchange partner identities (which family you exchange labor, food, and goods with). These overlapping identities influence how people interact with one another, how they make decisions and when they side with or against one another. For example, the Andibundu Efe see themselves as different from the Andibe Lese with different cultural histories and lifeways. But, as exchange partners they may choose to emphasize their exchange partner identity over their clan or ethnic identity when it comes to making shared labor allocation decisions (i.e., agreeing to work together to clear, plant, weed, and harvest a field).

The system of multiple identities is similarly manifest in Guatemala, Nepal, and PNG. All families share a
village identity but also recognize other ways to identify self from other. In Guatemala people recognize that some families are Maya Indigenous Peoples whereas others are mestizos who moved into the area to harvest chicle – but both mutually identify as forest people and residents of the village of Uaxactún. Studied communities in Madagascar and Nepal have both a village and ethnic identity that is closely linked to being forest people. In PNG people have village, ethnic and livelihood practice identities, each of which determines how they perceive themselves and others as either in-group or out-group and consequently whether they feel sufficient trust and social cohesion to be willing to work together to solve a common problem.

3.2 | Ostrom’s determinants of common pool resource governance

3.2.1 | Clearly defined territorial or resource access rights (principle 1)

The state formally recognizes the rights of CFC participants to land and natural resources in all of the cases studied, although the basis for and extent of this recognition varied significantly. Bolivia and PNG offer two of the clearest examples of recognition of rights. In Bolivia, the state recognizes the territorial rights of Indigenous Peoples as a specific form of land tenure, based on national law crafted to reflect the provisions of the U.N. Declaration on the Rights of Indigenous Peoples and the Indigenous and I.L.O. Convention 169, the Indigenous and Tribal Peoples Convention, 1989. In PNG, national constitutional law recognizes the customary rights of clans and forest conservation community-based organizations (CBOs) are recognized as a mechanism whereby clans may exercise their rights.

DRC and Peru offer examples of countries where other mechanisms are the basis for recognizing the rights of CBOs. In DRC, national law recognizes the existence of traditional or customary rights, but these do not stand up in the face of any kind of competing claim. In response, in 2016, the Ministry of Environment, Conservation of Nature, and Sustainable Development signed a decree, which allows local communities and traditional peoples to secure their rights by setting up a Local Community Forest Concession (LCFC) and exercising rights to manage forest as concession holders.

Peruvian law recognizes the rights of indigenous and peasant communities. However, these rights are only secure once a community completes the process of securing a formal title and communities are not always able to secure titles to all of the area they use. In the case of the TTRCCA, of the 13 communities located around the area participate in its management five are recognized. Recognition of the TTRCCA as part of Peru’s national protected area system recognizes community rights to manage the area by virtue of their participation in the protected area's management committee.

Of the CFCs included in our study, the community of Uaxactún, in Guatemala’s Maya Biosphere Reserve, faces the most significant legal restriction on its rights. Uaxactún was granted a 25-year concession, which is not automatically renewable. The CBO is expected to make a strong case for renewal by demonstrating that it has managed the concession well. However, there are no clear criteria for what constitutes being sufficiently successful to be assured that the concession will be renewed. So, it is possible that Uaxactún could lose its concession, even if it does an excellent job of resource management. Both interviewees noted that this creates what may be a perverse incentive, because some community members feel that investing resources to manage the concession well legitimizes the power of the government to take away their livelihoods.

In general, the cases studied confirm Ostrom’s finding that formal recognition of rights is important for successful common pool resource management. However, they also illustrate how grassroots initiative can be critical for achieving formal recognition. For example, the TTRCCA was originally created as a sustainable use area for the communities by the Loreto Regional Government, in response to pressure from communities that it address the problem of outsiders taking resources from community lands and waters, although its authority to do this was not clear at the time. Through a combination of effectively managing their natural resources, working with external partners to monitor and document their sound management and maintaining pressure on regional and national authorities, local communities created precedents for recognizing their rights to manage the area, which were eventually formalized with the creation of a system of Regional Conservation Areas that were recognized as part of Peru’s national protected area system.

3.2.2 | Rules adapted to local ecological and social conditions (principle 2)

One aspect of formal recognition of rights is that governments provide general parameters for CBO operations, including, in some cases, authority to enact rules that are adapted to local conditions. In some cases, CBOs exercise discretion without clear legal authority to do so. Some examples of exercising discretion reflect consensus
among CBO members that flexibility is appropriate, while others reflect what members view as arbitrary exercise of authority by CBO leadership.

In the Bolivia, DRC, Madagascar and Nepal cases, the formal recognition of the CBO authority includes provisions for them to adapt resource use rules to local ecological and social conditions. In Bolivia, for example, the indigenous territories prepare management plans that include explicit land use zoning that reflects ecological conditions and community priorities.

Similarly, in the DRC, LCFCs are required to produce management plans and have the authority to adapt the general guidance provided by the national government to local conditions. This includes recognizing customary rights and building those into the management plans. For example, these plans may grant pygmy members right to hunt and gather forest products that are not extended to Bantu members and to receive payment for these products from the Bantu members.

In Madagascar, CBOs also have the authority to recognize customary rights and these are reflected in management planning done at the level of individual CBOs. Here CBO regulations draw on informal cultural norms and practices, which help confer legitimacy on the regulations. Resource use rules also vary according to ecological conditions. For example, they place more restrictions on the use of fire in grassland areas and the regulations of CBOs located inside Makira Natural Park are more restrictive on resource use than is the case for CBOs located outside the park. The government also allows CBOs to decide whether or not they charge a membership fee, and to decide to charge higher nonmember resource use fees than members pay. All six Madagascar interviewees noted that this practice is felt by some to institutionalize a lack of fairness, because poorer families that cannot afford the membership fee must also pay more for resources than do their wealthier neighbors.

In Peru, communities participating in the management of the TTRCCA set annual quotas for how many animals may be hunted, based on wildlife monitoring data. Over the course of the year, a community may authorize someone to exceed their quota if their family is experiencing hardship. This practice is based on the communities’ view of their customary authority, but the authority to do this is not recognized as part of the formal rules for managing the TTRCCA. All four interviewees who discussed the experience of TTRCCA commented that some observers have criticized this practice as an example of local people having difficulty requiring relatives and neighbors to respect agreed upon rules and cite it as a weakness of community-based management. However, all four also emphasized that, over the 30 years since communities have been monitoring wildlife numbers, the populations of most hunted species have remained stable or increased.

In PNG, the four people interviewed pointed out that legal recognition of customary clan law perversely can increase lack of accountability, because the position of clan leader is hereditary and options for calling a clan leader to account for actions are limited. Clan leaders vary widely in their leadership styles, with some encouraging discussion and making themselves accountable and others not. However, there is no customary law mechanism through which they can consistently be held to account.

3.2.3 Most resource users participate in deciding who can use how much of a resource (principle 3)

All of the CBOs included in our study have mechanisms through which resource users participate in reviewing past performance, formulating or updating management plans, and keeping track of progress. Governments establish general parameters in which they operate, but the CBOs have the authority to govern the areas under their jurisdiction, by excluding outsiders and regulating the actions of their members.

Often, institutional structures and procedures to encourage participation are the outcome of shared identity and purpose among CBO members. Among all but one of the indigenous territories of northwestern Bolivia included in our study, for example, participatory mechanisms for decision-making are robust. These mechanisms reflect practices that are part of people’s shared indigenous identity and strengthened by their shared struggle to secure formal recognition of their territorial rights and elaborate management plans. The indigenous organizations that hold the titles to the territories convene assemblies of members, where progress on implementing the management plans and more general governance issues are discussed.

3.2.4 Monitoring is effective and compliance undertaken by accountable leadership (principle 4)

All of the CBOs participate in monitoring activities and use the results of monitoring for planning and making decisions about changes in how much of a resource can be used. To this end, they depend to varying degrees on NGOs and/or government to provide critical technical and financial support. Monitoring includes both changes in the state of the forest and forest resources as well as
changes in the well-being of CBO members. Monitoring of changes in the state of the forest resource includes changes in forest cover and vegetation and calculation of deforestation rates in all of the cases studied. Some CFCs also monitor wildlife take and changes in wildlife populations (e.g., indigenous territories in northwestern Bolivia and the villages of Peru’s TTRCCA) and the state of economically important non-timber forest products (e.g., xate palm, in Guatemala’s MBR).

Although people in all of the places included in the survey have historically monitored and regulated their own resource use, several circumstances contribute to the high reliance on external support for monitoring observed today. All 29 interviewees described the establishment of CFCs as a manifestation of how forest and forest resources are under a degree of pressure that had not been experienced previously. So, while local knowledge is important in guiding management, establishing a CFC was an effort to address conditions that risked or were overwhelming traditional management approaches.

One dimension of this is that efforts by powerful interests to appropriate community resources are often justified by claims that such appropriation will lead to development benefits that are greater than those generated by allowing the forest to remain in community hands, forcing communities to document the value of benefits generated by their management in ways that satisfy external factors, such as donors who want to know that the CFCs they support are efficient and efficacious. Additionally, in settings where CFCs must deal with illegal activities, monitoring requires applying methods that protect the security of community members and generate information that qualifies as evidence required by law enforcement authorities to act. As a result, CBOs often must measure and document indicators that are not tied to their own use of forest resources, but which meet the needs of partners upon which they rely to maintain control over their forests.

3.2.5 | Graduated sanctions imposed on resource users who violate CBO rules (principle 5)

All the CBOs have a system of regulations that they apply to their members. These regulations may be accompanied by a set of punishments that are applied by the organizations themselves to members who violate them. In Bolivia, the Tacana have regulations within their management plan for determining access and use levels of a broad range of natural resources within their territory. These include specific provisions for high value resources such as timber and caiman skins and meat. In addition, they also have the authority to apply formal laws as a subprovincial governing authority (corregimiento) and customary laws that they have used historically and may differ from those in their management plan. In governing their territories, the Tacana draw on all three to try to achieve a just outcome (Lehm, 2010, 2016).

The other CBOs studied also have systems of formal regulations, which are supported by national law and include the authority to draw on local customary rules and include varying degrees of authority to impose sanctions on rulebreakers. Respondents in the DRC, Madagascar, and Nepal cases, felt that the application of formal and customary rules tended to reinforce one another and contributed to the legitimacy of the CBO. However, in Cambodia both interviewees reported the existence of conflicts associated with whether formal or informal rules should apply in different situations and felt that this was related to the enduring distrust among CBO members.

The authority of CBOs to punish rulebreakers is generally limited to their own members. While all have the authority to exclude outsiders and apprehend outsiders who intrude on their jurisdictions, their authority is limited to apprehending rule-breakers and turning them over to law enforcement and judicial authorities. In PNG, anyone accused of breaking a rule, regardless of whether they are members of the CBO or outsiders, must be taken to village court, which has the authority to decide if a person has actually broken any rules and, if so, what is the appropriate punishment.

3.2.6 | Mechanisms of conflict resolution affordable and available to all (principle 6)

All of the CBOs have regularly scheduled assemblies for reviewing and approving plans, receiving implementation updates and taking stock of revenues and expenses and the power to call extraordinary meetings when a situation warrants. Within this general framework, all include mechanisms of conflict resolution among members and address problems in CBO leadership.

Interviewees identified a number of problems with these structures and processes, including lack of capacity to exercise governance authority effectively in the face of more powerful external forces, leaders who pursued narrow self-interest instead of collective good, favoritism, and a lack of checks and balances to limit the growth of patronage networks. Nonetheless, they also reported that members generally knew the rules and found decision-making to be transparent, or at least more so than the mechanisms for resolving conflicts and making decisions that had been in place prior to when the CBO was formed.
While all of the CBOs are generally successful in managing conflicts and addressing issues involving their members, they are often ineffective in resolving conflicts with powerful outside interests. In Bolivia, the six interviewees agreed that indigenous territories included in our study are generally very effective in defending themselves against settlers and loggers. However, they also noted that they are not able to oblige the national government to respect their rights in cases involving large-scale extractive industries that enjoy important political support.

Most seriously, in some of the CBOs, powerful government officials, the military and wealthy business interests are simply understood to be above the law. For example, in DRC, the national government makes Economic Land Concessions to the Army, with no consultation with or accountability to local government or the people living in and using the areas included in the concessions. In Cambodia, both interviewees agreed that the national government views CBOs favorably as valuable structures for effective governance. However, both also noted that important government officials, military officers and private sector partners ignore the recognized rights of CBOs with impunity. They worried that these situations have the potential to be especially destructive to CBOs, because the fundamental interest that brought people to form them in the first place was the need to exclude non-rights holding outsiders as a first step to governing their resources effectively.

3.2.7 | Community right of self-determination recognized by higher-level authorities (principle 7)

All the CBOs have extensive authority to exercise governance over land and natural resources within their territory. But they do not have the authority to block powerful political and financial sponsorship of the exploitation of subsurface resources nor demand royalties or tax revenues from such resource extraction within their territory.

Several of the CBOs also rely on government support to implement regulations and validate their accountability mechanisms. In Cambodia, for example, the two interviewees agreed that the high level of mistrust that exists within communities means that, while the legitimacy of the CBO is based on it being grounded in the communities, government validation of the actions of CBO management is critical. Similarly, in Madagascar, the government conducts monitoring missions and, in Nepal, the government conducts annual audits as part of their CBO oversight. CBO members use these exercises as mechanisms for holding leaders accountable.

Thus, while the CBOs generally have a lot of authority to make and enforce rules, this authority rests on being legally recognized by the state and in several cases government agencies play key roles as CBOs exercise that authority. By framing authority in terms of self-determination, Ostrom suggests that they have, or should have, levels of autonomy that do not exist in any of the cases we studied.

3.2.8 | Nested authority structure when governance involves large areas or multiple communities (principle 8)

Nested authority structures are quite common across the sample of CFCs included in this study. In the Bolivian and Peruvian cases, communities participating in the governance of a single area are dispersed and do not interact regularly. In the Tacana indigenous territory, in Bolivia, the 20 communities that are members of the CBO hold assemblies where they elect officers responsible for conducting the business of the organization and review the work that has been conducted. In Peru, participating communities elect representatives to the management committee of the TTRCCA. In Nepal, the community forest user groups included in our study are part of a national federation of user groups, the Federation of Community Forest Users, Nepal (FECEFUN), which was created to allow the user groups to have a larger collective voice in national policy issues of concern to forest users. Individual community forest user groups are aggregated, at the local, district, and national levels, with representatives elected to serve 4-year terms at each level.

4 | CONCLUSIONS

4.1 | The role of social cohesion

This survey of career practitioners in community forest management suggests that Olson (1965) is correct that social cohesion is a common attribute of successful community forest management efforts. But the survey also suggests that it is shared identity that is most the important factor contributing to cohesion and that this can occur largely absent of regular, positive face-to-face interactions as Olson suggests.

This is significant, as many communities located in places of critical importance to conservation are often scattered over large areas, precluding regular face-to-face meetings. While face-to-face interaction clearly fosters social cohesion, we find that common identity based on
shared interests has a greater influence on social cohesion than face-to-face interaction.

Moving forward, results of this survey suggests that conservation practitioners keen to help communities to work together to achieve a shared objective need to:

1. Understand whether members have a clear and strong sense of community identity, and if not determine why not, and
2. Conjure what might help members to build or maintain a common sense of in-group, a feeling of being neighbors with an identity unique to the neighborhood.

This is a tall order for conservation organizations because we are unaware of any practical guidance for practitioners to take action on these issues.

4.1.1 The governance of common pool resources

The CFC cases included in our study underscore the importance of the design features of common pool resource management identified by Ostrom (Gardner, Ostrom, & Walker, 1990; Gibson et al., 2000; Ostrom, 1990; Ostrom, 2000), and improves our understanding of how Ostrom’s design features influence, and are influenced by, the contexts in which they are applied.

Ostrom’s first design principle, that territorial or resource access rights need to be clearly defined is the point of departure for the work done by all of the CFCs included in this study. In all cases, the existence of clearly delineated areas over which the CBOs exercise jurisdiction, and clear understanding of the resources over which that jurisdiction extends, with the authority to regulate themselves and exclude outsiders, enables everything else the CBO does. Recognition of the CBO’s jurisdiction is extended by the state and the degree to which it is consistently upheld by political authorities at different levels plays an important role in influencing perceptions of the CBO’s legitimacy and effectiveness, by members and outsiders. However, while recognition comes from the state, grassroots efforts have played critical roles in securing that recognition. Therefore, supporting local initiatives to secure formal recognition of rights can be an important investment for conservation organizations and donors committed to promoting CFC.

The ability of CBOs to adapt rules to local conditions plays a key role in influencing their effectiveness and legitimacy. One of the founding principles of community-based approaches is that decision-making authority should rest with the smallest, lowest or least centralized competent group, because these are the people with the greatest local knowledge and the greatest interest in the success of local initiatives. Thus, adapting rules to local conditions improves the quality of management by being responsive to the characteristics of the place and the needs and priorities of local people for whom the CBO is a vehicle for their efforts to improve their quality of life. Because CBOs involve formalization of rules and the adoption of structures and procedures that national laws require for them to be legally recognized, some of which may be outside the experience of local people, their ability to draw on and utilize structures and procedures tied to local custom is an important source of legitimacy among their own members.

The cases included in this study show that Ostrom’s seventh design principle, that higher-level authorities should recognize community rights to self-determination, is complex. This is evident when one considers self-determination in light of the first principle, that territorial and access rights are clearly defined, because that recognition comes through those very higher-level authorities. This suggests that community rights to self-determination are relative and in a constant state of negotiation. In fact, the CBOs studied rely heavily on higher-level authorities for support in a number of critical areas, including:

1. Dealing with external threats like identifying and addressing threats posed by large-scale development investments in infrastructure and extractive industries and sanctioning the behavior of rulebreakers from outside the community;
2. Providing mechanisms for holding CBO leaders accountable for their behavior and upholding the legitimacy of decision-making in areas like enforcing rules and sanctioning members who break them;
3. Providing technical and financial resources to allow communities to monitor changes and impacts resulting from their efforts, especially those not directly related to their own resource use.

In general, the relationships between the CFC initiatives studied and higher-level authorities are positive. However, the vital roles those authorities play in providing the kinds of services noted above means that they are sufficiently enmeshed in community affairs that communities are not autonomous in many critical areas. Because of this, when higher-level authorities fail to do their jobs, the impacts on CBO effectiveness, efficiency and the commitment of members to work within their structures and support them can be significant.

Collectively, the cases sampled suggest that there can be sufficient social cohesion for CFC initiatives to take root as long as participants share an interest in protecting
forest resources that distinguishes them from actors more interested in transforming forest ecosystems to use the land for other purposes. These initiatives deliver forest conservation and livelihood benefits even though there are significant limitations on multiple principles of common-pool resource management and can do so over biologically and politically significant areas. Our findings suggest that the critical issues are that territorial and resource access rights be clearly defined and that relations with higher level authorities allow specific conditions associated with the other design principles to be negotiated in response to changing circumstances so that issues critical to participants can be resolved in ways that do not undermine the shared common pool resource management enterprise. As a result, participants in CFCs are able to cover many of the costs of growing and maintaining a CFC through their domestic production arrangements, making CFCs a very cost-effective vehicle for conserving forests and satisfying basic livelihood needs.

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CONFLICT OF INTEREST
The authors declare no conflicts of interest.

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David Wilkie and Michael Painter conceived the idea and co-wrote the article.

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Additional supporting information may be found online in the Supporting Information section at the end of this article.

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