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Addressing conflict through collective action in natural resource management

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Abstract: The food security crisis and international "land grabs" have drawn renewed attention to the role of natural resource competition in the livelihoods of the rural poor. While significant empirical research has focused on diagnosing the links between natural resource competition and (violent) conflict, much less has focused on the dynamics of whether and how resource competition can be transformed to strengthen social-ecological resilience and mitigate conflict. Focusing on this latter theme, this review synthesizes evidence from cases in Africa, Asia, and Latin America. Building on an analytical framework designed to enable such comparative analysis, we present several propositions about the dynamics of conflict and collective action in natural resource management, and a series of recommendations for action. These propositions are: collective action in natural resource management is influenced by the social-ecological and governance context; natural resource management institutions affect the incentives for conflict or cooperation; and, the outcomes of these interactions influence future conflict risk, livelihoods, and resource sustainability. Action recommendations concern policies addressing resource tenure, conflict resolution mechanisms, and social inequalities, as well as strategies to strengthen collective action institutions in the natural resource sectors and to enable more equitable engagement by marginalized groups in dialogue and negotiation over resource access and use.

Keywords: Collective action, cooperation, governance, natural resource management, resilience, resource conflict

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1. Introduction

The food security crisis, international "land grabs," and the emergence of new markets for environmental services have compelled the international development community to pay renewed attention to the role of natural resource competition in the livelihoods of the rural poor. Combined with this is a heightened attention to the disruptive role of violent conflict in undermining development progress

(DFID 2015; UNDP 2015). Local disputes over land, water, forests, and fisheries can contribute to broader social conflicts. Climate-induced migration can spur competition for resources such as cropland and freshwater, and stress or undermine existing social institutions (Fearon and Laitin 2011). Management of natural resources, however, can also be a focus of cooperation – at times encouraged by stress – helping to build resilient institutions that can moderate and reduce the disruptive impacts of conflict and/or facilitate the work of post-conflict reconciliation and rebuilding (UNEP 2009; Bruch et al. 2016).

While significant empirical research has focused on diagnosing the links between natural resource competition and violent conflict, much less analysis has focused on the dynamics of how resource competition can be transformed to strengthen social-ecological resilience and mitigate conflict. Focusing on this latter theme, this review synthesizes empirical evidence from cases in Africa, Asia, and Latin America. In particular, we draw lessons for practice by showing how understanding the factors that influence collective action can yield insights about the policies and strategies needed to promote cooperative and equitable outcomes. We present three propositions about the dynamics of conflict and collective action in natural resource management, followed by recommendations for action. Our main argument is that interventions can shift the incentives towards cooperative and equitable management of resource competition and reduce the likelihood of an escalation of social conflict and violence. Our key objective is to underpin this argument with a synthesis of evidence to suggest the major areas where such interventions may be effectively made. We pursue this objective by analyzing recent experiences and cases within an analytical framework designed to assess the role of collective action in natural resource conflict and cooperation (Ratner et al. 2013).

The paper is organized as follows. We begin with an overview of the role of collective action in conflict and cooperation over natural resources, using the aforementioned analytical framework. We identify factors that affect the incentives for cooperative and equitable management of resource competition, which can be addressed to reduce the likelihood of broader social conflict and violence or its escalation. The subsequent sections outline ten recommendations for action, grouped in the following three windows for intervention: governance and policy-level interventions; strategies to support natural resource management institutions in promoting collective action; and, routes to influence the arenas in which disputes are played out. The concluding section highlights the need to systematically assess the outcomes of such interventions as they affect local livelihoods, resilience, and future conflict risk.

2. The role of collective action in conflict and cooperation over natural resources

In this section we provide three propositions and a framework to understand the role of collective action in conflict and cooperation over natural resources. As the

framework is introduced and explained in more detail elsewhere (Ratner et al. 2013), our focus here is on the implications for action. In other words, how does such a framework help identify factors that affect the incentives for cooperation in natural resource management? And how does it help elucidate pathways for engagement by diverse social actors to reduce the likelihood that resource competition contributes to broader social conflict and violence?

Collective action comprises concerted group effort to achieve a shared goal. This can be done directly by group members or on their behalf by an organization (Marshall 1998). Collective action is pervasive in societies, although the strength and forms of collective action vary greatly, from sporadic events to highly structured and long-standing organizations. Although collective action is often discussed as a good thing, associated with harmony and mutual benefit, it is not necessarily advantageous to everyone or benign. Collective action institutions can be highly inegalitarian; groups can act collectively to exclude others; and the outcome of their action can be negative (e.g., criminal gangs engage in collective action). Indeed, many forms of violent conflict can be seen as the clash between groups who are each acting collectively.

We use the term "conflict" to cover a continuum of patterns of interaction among stakeholder groups. This extends from short-term confrontations among competing resource users where violence is avoided, to sustained, violent confrontations involving diverse political factions, ethnic groups, or state actors. Disputes *within* groups are not covered in our definition of conflict, as we consider these part of the normal, even salutary, functioning of collective action institutions (Van Laerhoven and Andersson 2013). Nor do we focus on interstate conflict or war. Research on the role of natural resources in contributing to conflict and the potential for cooperation among states has been more thoroughly reviewed elsewhere (Le Billon 2001, 2012; Ross 2004; Barnett and Adger 2007; Welsch 2008; Lujala 2010; Scheffran et al. 2012; Koubi et al. 2014).

While acknowledging that subnational conflict and instability can contribute to interstate conflict, particularly in border zones or where transboundary resources are concerned, our focus instead is on the role of natural resources in local livelihoods, and how this is manifested in the dynamics of conflict and cooperation. By referring to dynamics we accentuate the temporal dimension, recognizing that over time peaceful situations can become conflictive, conflicts can be resolved and transformed into more cooperative forms of interaction, and post-conflict environments can return to conflict. This framing also recognizes that cooperation and competition can exist in parallel among the same groups of actors, for different resources (e.g. competition over land tenure combined with cooperation over shared waterways), and that experiences of conflict or cooperation in one realm can influence interactions in another.

"Resilience" refers to the capacity of a social-ecological system to absorb disturbances and reorganize while undergoing change to retain essentially the same function, structure, identity, and feedbacks (Walker et al. 2004). This means sustaining the productivity of the resource systems at hand and the livelihood ben-

efits these generate, but also the adaptive capacity of social institutions to manage or cope with change in ways that do not lead to social breakdown and violence. At times, more fundamental transformation of regimes governing resource access and use is required to restore equitable livelihood benefits or address long-term risks to environmental services.

Research is available to explore the links between collective action, conflict, and resilience in the domain of developing country natural resource management, but it is not often articulated in these terms. As a way of organizing these related strands of research, we offer the following three propositions:

1. *Collective action is necessary for many types of natural resource management.* As illustrated in Figure 1, investments and resource management activities that take place at the farm level (like sowing) can be efficiently carried out by individuals, but management activities such as integrated pest management and watershed management require action on the part of many individuals and, hence, require some form of coordination. Coordination may be provided by the state, market, or collective action within civil society; resource systems that span national boundaries may require international institutions to coordinate. For most resource management activities at the local level, the cost of state or market agents to monitor behavior and enforce rules is high, whereas collective action can draw on mutual monitoring efforts of people who are already in contact with the resources. Some degree of resource scarcity in relation to demand, and therefore a need to manage competition, is a classic precondition for the emergence of collective action institutions for natural resource management (Ostrom 1990; Tiffen et al. 1994).
2. *The character of existing natural resource management institutions affects the scope for collective action and conflict management.* Figure 1 also illustrates that resource management with a long time horizon is unlikely to be successful unless those who are expected to invest also have appropriate secure property rights that give them authority not only to manage the resource but to reap the rewards as well. Thus, many successful examples of natural resource management also have some form of common property, and these institutions help reinforce collective action. Strong collective action *within* a social group ("bonding") can intensify conflict with opposing groups, but collective action that spans opposing groups ("bridging") can reduce conflict (Sanginga et al. 2007). In some cases, particularly with increasing complexity of property rights at larger geographic scales, conflicts cannot be managed by collective action alone, so mediation by state agencies or other external actors, or conflict resolution through the judicial system may be necessary. The incentives for collective action also shift over time because of changes in the character-

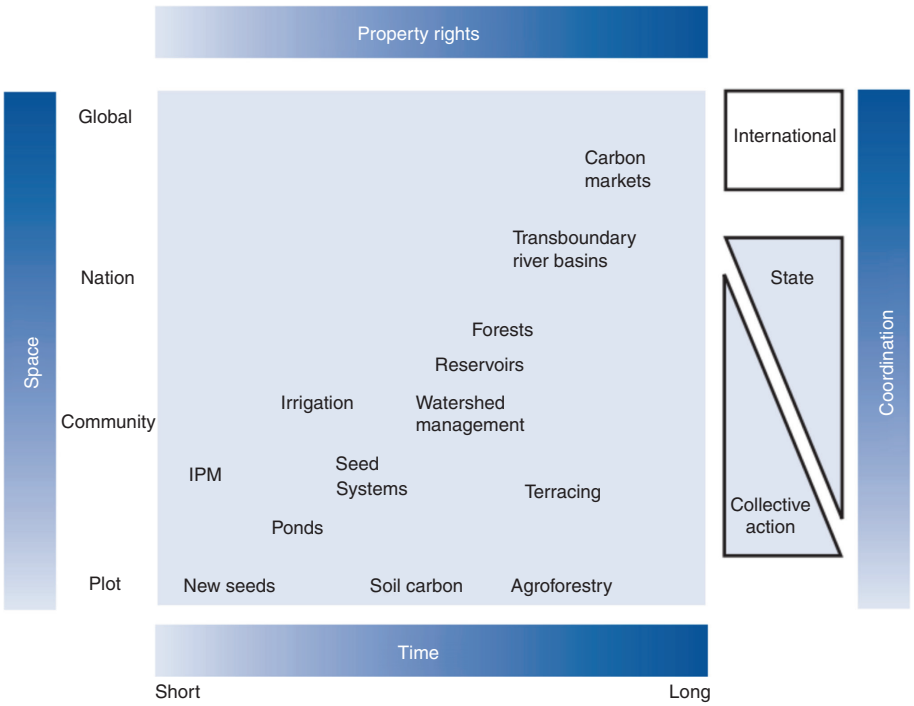

Figure 1: Framework for recognizing importance of collective action in natural resource management. Source: Meinzen-Dick et al. (2010).

istics and motivations of resource user groups, patterns of resource use and management, and governing institutions.

3. *Understanding the factors that influence collective action is key for any purposive effort to promote cooperative natural resource management, conflict transformation, and resilience.* Many effective forms of collective action are based on customary institutions that have evolved. Internal actors (such as community leaders or youth) and external organizations (such as governments and NGOs) shape such institutions and may attempt to organize and/or facilitate new forms of collective action. However, collective action cannot be simply ordered into existence. The existence of an organization does not necessarily mean that collective action will occur, since it may not be able to motivate people to work together. Violent conflict may undermine natural resource management institutions and other valuable forms of collective action (Korf and Funfgeld 2006; Lautze and Raven-Roberts 2006; Weingart and Kirk 2008) or encourage it in new, destructive forms (Unruh and Abdul-Jalil 2014). An increasing body of research nevertheless demonstrates the

potential for natural resource management to contribute to post-conflict peacebuilding (Young and Goldman 2015; Bruch et al 2016).

Building on these propositions, the primary focus of this paper is to understand how interventions that promote collective action can help shift the incentives towards cooperative and equitable management of resource competition, thereby reducing the likelihood of broader social conflict and violence, and strengthening the foundations for social-ecological resilience. We apply an analytical framework designed to assess the role of collective action in natural resource conflict and cooperation (Ratner et al. 2013). The framework, which builds on the Institutional Analysis and Development (IAD) framework that Ostrom (1990, 2005) and others have used as the basis for analysis of the environmental commons, has four main elements: context, collective action institutions, action arena, and outcomes (see Figure 2). The context comprises characteristics of the resources and resource users (including livelihood assets and vulnerabilities), as well as governance arrangements (understood as distribution of power, representation, and mechanisms of accountability). Each of these can be "unpacked" through reference to the literature that generates and/or tests hypotheses about how specific contextual features influence collective action for natural resource management (see Agrawal 2001). Collective action organizations such as water user associations, community forestry organizations, and farmer cooperatives provide rules and norms to guide behavior regarding resource access, use, and benefits. To the extent that other actors respect these institutions, they may direct and constrain their actions accordingly.

Any particular dispute takes place within a socially defined "action arena," the forum in which different stakeholders interact. Arenas exist at multiple scales, and may be both formal and informal: a traditional village council, a mediated conflict resolution process, a private sector investment review, formal proceedings in national courts or parliamentary bodies, or a transboundary policy dialogue, to name just a few. While the broader context and relevant collective action institutions affect actors' choices within such an arena, these choices also depend on the "action resources" that each enjoy, and the rules that govern their use. The patterns of conflict and cooperation that emerge have outcomes that in turn may influence the context, collective action institutions, and characteristics of the action arena in future rounds. (See Ratner et al. 2013 for a detailed explanation of the framework.)

Recognizing the agency of diverse actors linked across multiple scales highlights that there are multiple potential windows of intervention in any given case of resource competition. Broadly speaking, we identify three such windows for positive engagement, as illustrated in Figure 2. In subsequent sections of the paper, we explore each of these three windows in turn, and elaborate corresponding action recommendations:

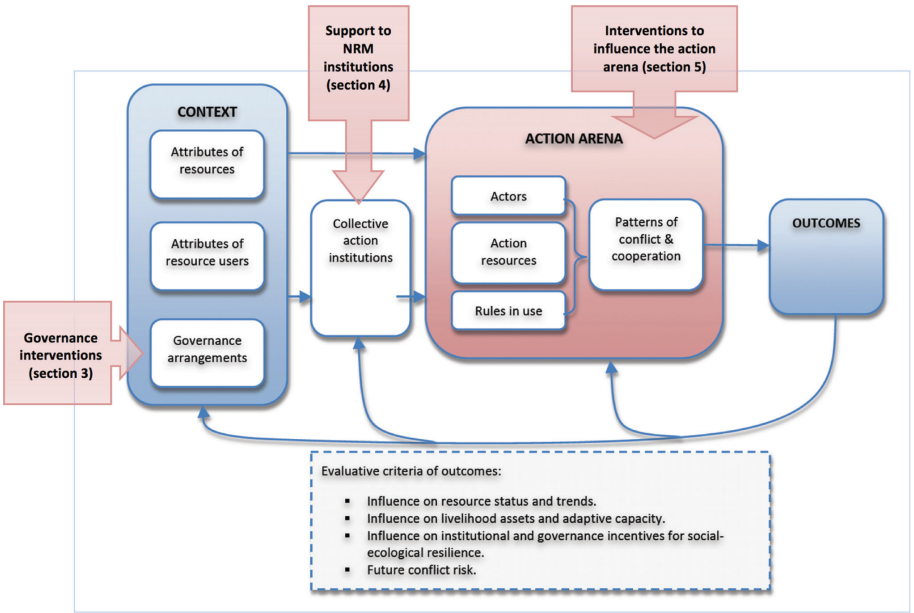

Figure 2: Conceptual framework on resource conflict, collective action, and social-ecological resilience, showing 3 windows for intervention. Source: Ratner et al. (2013), adapted from Ostrom (2005) and di Gregorio et al. (2008).

- Governance and policy interventions that promote collective action in natural resource management (Section 3).
- Support to natural resource management institutions to increase their capacity for collective action to respond to resource competition (Section 4).
- Measures to affect the action arena to (i) shift incentives in favor of cooperative and equitable resolution of resource conflict and (ii) to enhance conflict resolution processes (Section 5).

3. Improving governance to promote collective action that reduces or prevents conflict

Numerous actors have a role in governance improvement. National governments may reform policies addressing resource management and allocation specifically or mechanisms for public participation and public sector accountability more generally. Development cooperation agencies may finance or provide technical assistance or invest in capacity building to aid such reform efforts. Civil society

actors, both domestic and international, may advocate for policy and institutional change, including through broad-based social movements. International bodies such as the World Trade Organization and private sector initiatives such as the Forest Stewardship Council also shape resource governance.

For all such actors, there are opportunities to improve the governance context in ways that promote collective action for equitable resource management. Below we summarize four priorities for policy and legal reforms to (1) clarify resource tenure, (2) enable collective action among small-scale producers, (3) strengthen both statutory and traditional conflict resolution mechanisms, and (4) proactively address inequalities in natural resource access and management.

3.1. Engage community institutions to establish clarity in resource tenure

Many failures of tenure reform result from a rush to impose new tenure regimes without sufficient understanding of local realities and existing tenure arrangements. A 2006 forestry decree banning illegal logging in Afghanistan failed to address the interests of key stakeholders; as such, it reinforced a view of the government as out of touch, ineffectual, and corrupt – all of which undermined governmental legitimacy (Nichols and Al Moumin 2016). In Mali and Tanzania, national policies to promote agricultural development have deprived herders of their traditional pastoral land, resulting in local farmer-herder conflicts (Benjaminsen and Ba 2009; Benjaminsen et al. 2009). The Rwandan government introduced legal reforms and a major campaign to formalize land tenure with the objective of increasing productivity but failed to develop processes that could accommodate the complexity of small, dispersed land holdings and traditional norms for intergenerational transmission of land ownership (Bruce 2009; Pritchard 2010). As research in Nepal has shown, the process of codifying water rights can also stimulate conflicts where customary arrangements had previously functioned relatively harmoniously (Pradhan and Pradhan 2000).

The experience of developing forestry regulations in Liberia demonstrates the benefits of an inclusive, locally adapted, and deliberative process for reforming management of natural resources essential to livelihoods and the national economy (Brottem and Unruh 2009; Altman et al. 2012). The work of the Barza Intercommunautaire (intercommunity meeting or discussion), which successfully mediated interethnic land disputes between 1998 and early 2004 in the North Kivu region of the Democratic Republic of the Congo similarly illustrates the ability of community level institutions to diffuse potential resource conflicts (Clark 2008). In Zambia, collective agreements governing animal grazing and bush fires have reduced conflict over land rights, including protecting the interests of poorer community members (Ajayi et al. 2012).

Where population movement is rapid, as is the case with internally displaced persons or international refugees in the wake of conflict, or with returnees being resettled after years of dislocation, it may be desirable to introduce provisional resource tenure and access arrangements before confirming statutory rights

(Unruh and Williams 2013). It is also useful to note how shifts in tenure may affect the dynamics of cooperation. A study from Samburu pastoral communities in Kenya, for example, found that in communities where collective land holdings were dissolved, the odds of cooperating in communal farm labor were 93% lower compared to communities that maintained group ranches (Grimm and Lesorogol 2011).

3.2. Enable collective action among small-scale producers

Governments in many countries have come to recognize that local bodies are often able to manage natural resources more effectively, efficiently, and democratically than central governments, and have implemented policy reforms to transfer management authority to local governments and resource users. Devolution of rights and responsibilities to local groups is an important step in establishing a legal framework to foster collective action, but does not guarantee that successful collective action will emerge. Rather than simply withdrawing from the local arena, governments must continue to play a role by offering policies that support local rules and authority, sanction local organizing, support the property rights of local users, and ensure the enforcement of such rights (Meinzen-Dick et al. 2001).

While collective action can proceed – and is often successful – when undertaken outside the ambit of statutory law, laws and regulations can create an enabling environment that formally recognizes, supports, and protects collective action among small-scale producers. In Nepal, for example, the 1993 forestry law allowed the establishment of community forest user groups that have the authority to manage community forests, collect revenues, and decide how to use the revenues (Sanio and Chapagain 2012). An increasing number of fragile and conflict-affected states, including Liberia, Mozambique, and Cameroon, have adopted legislation supporting community forestry (Harwell 2010). States can also foster collective action by investing in capacity strengthening of local communities and ensuring that financial support is provided in a way that stimulates rather than undermines collective action (Meinzen-Dick et al. 2001; Bruns and Bruns 2004).

Several factors can enable partnerships and collective action at multiple scales to take advantage of market opportunities including foreign direct investment in agriculture and integrated, international value chains (Castro and Stork 2015). A policy and regulatory framework that requires assessment of the social distribution of benefits from investment schemes, for example, can encourage alternatives to the archetypal "land grab" characterized by a fully integrated plantation-style operation where the company hires in labor to cultivate land it controls. Farmers displaced by large-scale, capital-intensive farms struggle to recover from economic losses associated with the acquisition of their land unless there are safeguards in place to prevent this (Robertson and Pinstrup-Anderson 2010).

Policies that support small-scale producers to tap into organic and fair trade niche markets can provide incentives for collective action to boost local incomes and livelihoods. The organic agri-food system has been transformed from loosely

coordinated local networks of producers and consumers into a globalized system of formally regulated trade which links socially and spatially distant sites of production and consumption (Raynolds 2004). Certification schemes including the Forest Stewardship Council for forest products and the Marine Stewardship Council for seafood fill a similar role by providing internationally recognized norms for sustainable production and trade. For small-scale producers, the barriers to certification can be high (King and Venturini 2005), as well as the costs of ongoing monitoring (Mutersbaugh 2005). But policies that provide incentives for sustainable resource management through certification and higher prices, and assist small-scale producers to take advantage of such opportunities, can ultimately increase household profitability and reduce conflict, as producers focus on how to cooperate towards the collective goals of achieving and maintaining certification.

3.3. Strengthen both statutory and traditional institutions for conflict resolution

Efforts at legal and judicial reform and institutional capacity strengthening often focus separately on statutory versus customary mechanisms for conflict resolution and justice, sometimes ignoring one side of the spectrum altogether. In most cases, however, statutory and customary mechanisms are highly complementary (Sanginga et al. 2007; Nkonya and Markelova 2009). Failure to recognize and legitimize this legal pluralism is at the root of many resource tenure conflicts (Meinzen-Dick and Pradhan 2002). In postcolonial Africa, laws governing natural resource management were formalized based primarily on Western legal norms, and most countries emphasized formal conflict resolution mechanisms even in instances where these had little or no legitimacy in the eyes of local resource users (Mamdani 1996).

While statutory law and judicial institutions have significant benefits that include the potential for bridging across widely disparate social groups, including non-local and foreign actors, customary conflict resolution mechanisms offer distinct advantages as well (Meinzen-Dick and Pradhan 2002; van Koppen et al. 2007; Funder et al. 2012). These include:

- *Accessibility*. In line with the subsidiarity principle, customary conflict resolution mechanisms are embedded within communities at the lowest appropriate level, often making them the most accessible to resource users, in both cost and time. By operating in local languages and with simpler procedures than the statutory legal system typically requires, barriers to raising and resolving grievances are significantly reduced. This is one reason Funder et al. (2012) found that people favor locally controlled institutions over external ones in resolving water disputes.
- *Social cohesion*. Customary conflict resolution typically gives priority to reestablishing harmony and social cohesion as distinct from the

adversarial approach in many formal legal systems. Taking into account the influence of a conflict on the broader community and the need to maintain future interactions among the parties in other domains, traditional mechanisms often include significant social pressure on the parties to reach a compromise (Meinzen-Dick and Pradhan 2002; Funder et al. 2012). Because they are rooted in local institutions, these mechanisms often also enjoy greater legitimacy in the eyes of local resource users (Meinzen-Dick and Pradhan 2016).

- *Adaptation*. Rooted in locally defined rules and norms, customary conflict resolution is also highly varied and adaptive, responding to changing resource demand. Local rules and norms have been used to resolve natural resource disputes on water, land, grazing, fisheries, and forestry resources. For example, the gadaa system among the Oromo in Borena, Ethiopia, has adapted to the increased demand of land and grazing resources and has continued to resolve conflicts despite attempts by the government to undermine it (Edosa et al. 2007).

The challenge in legitimizing and strengthening customary conflict resolution mechanisms is to preserve such benefits while ensuring complementarity with the formal legal and judicial system, including foundation principles of human rights. For example, this means mandating equity in access to local natural resource conflict resolution mechanisms with regards to ethnicity, caste, and gender – areas where customary institutions may be highly inequitable (van Koppen et al. 2007). It also means monitoring and mitigating the risk that customary institutions legitimize resource capture by local elite, a problem that in Sierra Leone, for example, contributed to broad social conflict, and ultimately civil war (Fanthorpe 2001; Unruh and Turray 2006). In addition to legal and regulatory reforms, capacity building efforts can mitigate against such risks by improving the equity and effectiveness of traditional institutions.

3.4. Address horizontal inequalities through natural resource policies

Many conflicts occur along lines that Stewart (2008) terms horizontal inequalities, those between social groups (contrasted with vertical inequality by income strata across a whole society). Such groups may be defined by region, ethnicity, religion, or occupation. While horizontal inequality alone is insufficient to explain violent group mobilization, it can be an important motivating factor when an economically marginalized group is also politically excluded. For example, Suliman's (1999) study of conflict in Sudan argues that a combination of drought, Baggara expansion into Nuba territories, and state allocation of productive lands to absentee landlords undermined the Nuba's customary land and water rights, and contributed to the outbreak of violence between these groups during the civil war.

Horizontal inequality can be reduced through targeted measures aimed at political, economic, and social inclusion. Political inclusivity is not assured sim-

ply by the implementation of democratic processes such as elections (Stewart 2008). Stewart (2000) notes that every observed case of sustained civil conflict lacks political inclusivity, whereas well-known peace-making regimes, such as post-Pinochet Chile, and South Africa under Mandela, have all adopted inclusive polices. Economic and social inclusivity can be achieved by ensuring balance in group access to benefits from government expenditures, and access to education, health services, water and sanitation, housing, and consumer subsidies. Equality in education is especially important as it can help bridge income gaps among social groups. Ghana is a case in point, where targeted policies to reduce the developmental gap between northern and southern regions, and the commitment of consecutive political leaders to maintain a culturally and religiously inclusive state has deflated motivations toward violent conflict (Langer 2009).

International aid agencies have tended to focus on vertical rather than horizontal inequality, hence, little explicit experimentation has taken place to test and refine policy measures that aim for inclusivity as a feature of natural resource management. By contrast, social movements for land rights and community-based management of forests and fisheries frequently cite group identity and social exclusion as prime motivating factors (Green 2015). When governments recognize and respond to these intergroup grievances before they lead to widespread violence, the resulting policy shifts can reinforce equity in resource access as well as social stability. Government reforms to expand community fisheries in Cambodia exemplify such responsiveness to civil society mobilization (Ratner 2006). Likewise, reforms in Zimbabwe to devolve authority and benefits from wildlife management, were partly a response to conflicts between communities and the state by providing economic opportunities in ecologically marginal areas (Mapedza 2007).

4. Strengthening collective action institutions for natural resource management

Actions to address the broad governance context influencing natural resource conflict and cooperation (previous section) represent the most systemic level of intervention, extending well beyond the domain of natural resource management. Efforts to address the action arena (Section 5) represent the most immediate level of intervention, aimed at influencing conflict and cooperation around specific instances of resource competition. This section focuses on the intermediate level, namely actions that reinforce and strengthen institutions that enable positive collective action for natural resource management. Such institutions are not necessarily designed or initiated specifically to address resource competition; their focus may be to preserve social identity, improve efficiencies in resource allocation and management to generate economic and livelihood benefits, or even reduce the fiscal burden on the state by transferring responsibilities to user groups (Ostrom 1990; Webb 2008). Here we summarize interventions to support collective action institutions by (1) building capacity for collective action, (2) embedding support in broader reconciliation processes, and (3) promoting conflict prevention.

4.1. Build capacity for collective action

Much research has focused on how failed or failing states contribute to the emergence of violent struggles for high-value extractive resources, such as oil, gems, and timber and associated revenue, as well as how such conflicts contribute in turn to state failure. Weakened state capacity is a key explanatory factor linking resource wealth to civil war (Le Billon 2001; De Soysa 2002; Humphreys 2005). Similarly, weakened state capacity amidst conflict contributes to declines in social welfare and increased household vulnerability (Lautze and Raven-Roberts 2006). Civil war can profoundly disrupt rural livelihoods, as demonstrated in the case of agricultural livelihoods in Darfur (Buchanan-Smith and Jaspars 2007) and fisheries in Sierra Leone (Thorpe et al. 2009).

Investing in natural resource management institutions that enable collective action to sustain local livelihoods can serve both to prevent the escalation of rural resource conflicts (Ratner 2015) as well as to aid recovery in post-conflict settings (Bruch et al. 2016). Where collective action institutions for natural resource management are functioning effectively before broader conflict emerges, they frequently buffer the disruptive effects of conflict on rural livelihoods. They may also limit the spread of conflict, as norms of cooperation, collective decision-making and enforcement developed around the resource management problem may be applied in other domains (Sanginga et al. 2007). In Nepal, for example, community forest user groups that emerged in the 1970s with government support continued to manage local forest resources during a decade-long Maoist insurgency that disrupted the functioning of the national Department of Forests (Adhikari and Adhikari 2010) and are credited with helping avert broader deprivation and social upheaval (Sanio and Chapagain 2012).

While conflict may spur collective action on the part of groups at risk, particular capacities, legal protections and support from state and external civil society institutions are typically required to help channel such mobilization towards equitable outcomes (Yasmi et al. 2011). In some cases, traditional resource management or conflict resolution institutions may be effective locally but prove incapable of addressing disputes at broader scales, such as watersheds where ecosystem services depend on the actions of upstream forest communities and downstream agricultural or industrial users (Piñon et al. 2012). In such instances, investing in capacity for dialogue and collective action at these broader scales becomes essential. Third parties that provide this kind of capacity support are, however, often understaffed and under-resourced as well (Gomez and Ravnborg 2011), so investing in such groups with a proven track record can be one of the most cost-effective routes to strengthening local institutions.

4.2. Embed support to collective resource management in broader reconciliation processes

Beyond its direct impact on rural livelihoods, violence also undermines the capacity for collective action that bridges competing social groups and enables social

networks to function (Lautze and Raven-Roberts 2006). When this "bridging" social capital is undermined, the bonds of reciprocity, obligation and trust necessary to maintain intergroup relations supporting resource tenure, trade, and other dimensions of rural livelihoods are jeopardized. During Sri Lanka's civil war, for example, Tamil and Muslim communities that had previously maintained cooperative institutions regulating rural resource access were pitted against each other, destabilizing these institutions and altering common-pool resource entitlements (Korf and Funfgeld 2006).

For these reasons, efforts at post-conflict livelihood rehabilitation should leverage natural resource management to contribute to social reconciliation, in addition to helping secure the basics of food, water, and shelter for affected groups. For displaced peoples and refugee groups in particular, the prospects for successful repatriation depend significantly on the extent to which they are provided access to resources, freedom of movement, and the ability to work alongside their hosts to pursue a livelihood (Jacobsen 2002). In some cases this may also provide an opportunity to improve relations between previously conflicting groups, though this may require focused efforts at mediation to avoid fostering renewed conflict.

The most high profile approach linking natural resource management and reconciliation is the establishment of international peace parks (Walters 2015; Westrik 2015). These cross one or more international borders and are intended to have common management practices, often to conserve a single transnational ecosystem. The first international peace park established in a conflict zone was in the Cordillera del Condor region of Ecuador and Peru, and the 1998 peace treaty between the two countries cited conservation measures explicitly (Kakabadse et al. 2016). Most peace parks established since are located between countries without active violence. In addition to their symbolic value, the negotiation that these efforts require among government authorities, scientists, and communities can improve longer-term collaboration. Mediation services to aid in the establishment of a joint wildlife corridor between Tanzania and Mozambique, for example, helped improve cross-border ties, while dialogue to create a conservation zone in the border region of Thailand, Cambodia, and Laos helped reduce political tension while improving livelihood opportunities and buttressing regional stability through ecotourism (Ali 2007).

Peace parks may also be politically contentious, however, as was the case with the Great Limpopo Transfrontier Park between South Africa, Mozambique, and Zimbabwe. While South Africa and Mozambique were in agreement on the park, in Zimbabwe the scheme was perceived as an external agenda driven by foreign donors, NGOs, and the South African government (Duffy 2006). In this case, the vision of the park was overtaken by efforts to control the lucrative wildlife trade in the region and its illicit networks of poachers and traders. Recognizing the risks with such efforts underscores the importance of transparency and authentic involvement of the diverse range of local stakeholders in decision-making, with particular attention to benefit sharing and security (Ali 2007).

4.3. Promote collective action in natural resource management as a means of conflict prevention

Some natural resource management efforts explicitly target conflict prevention. Following a peace agreement in 1996 between separatist rebel groups and the Philippines government, for example, the newly established Autonomous Region in Muslim Mindanao experienced persistent local conflict between Christians, Muslims, and indigenous groups, much of it rooted in historical grievances over resource access and tenure. By purposively including marginalized groups in community-based institutions for joint forest and coastal zone management in the region, a natural resources governance initiative has succeeded in reducing the level of intergroup violence, helping avert a return to civil war (Brady et al. 2015).

While policy measures to decentralize natural resource management or rural development planning are common, the actual distribution of authority embedded in such policies has an important effect on institutions to resolve conflict and promote collective action (Ribot et al. 2006). In particular, where local government institutions or community organizations such as fishery or forest user groups have the power to amend rules that govern resource allocation and use, there is greater scope for adapting these to local conditions, therefore minimizing local conflict. Delegation of conflict resolution authority or official recognition of the legitimacy of local institutions can similarly enable positive collective action at the local level to seek out negotiated solutions to resource conflicts.

When decentralization reforms come, however, with inadequate measures for local representation, downward accountability, or resources for implementation, they may constrain or undermine local collective action to secure resource tenure and manage resource competition. In Africa, many traditional institutions led by local chiefs have been co-opted as part of nominal decentralization reforms to serve the interests of colonial and postcolonial governments, undermining their legitimacy in the eyes of local residents (Mamdani 1996). Decentralization reformers have also sought to cut government costs by shifting responsibilities for resource management without complementary rights and authority (Meinzen-Dick et al. 2001). In Uganda, for example, the formerly well-funded forest department lost budget resources and staff capacity after decentralization, hampering forest monitoring and undermining support for community-based management (Banana et al. 2007).

Governments can also promote collective action institutions through policy and legislation. In East Timor, the government explicitly recognized traditional leaders and customary practices governing natural resource use, even paying for ceremonial expenses needed to witness and reinforce prohibitions on tree felling or other environmentally damaging practices, reinforcing both the new state and customary authorities (Miyazawa 2013). In the Philippines, while rights defined in the national Water Code sometimes contradict the customary rights protected by the Indigenous Peoples Rights Act, the legal framework nevertheless provides

local actors a means to navigate this ambiguity and negotiate informal rights-sharing between competing claimants (Piñon et al. 2012).

Government policies can also frustrate and impede collective action in natural resource management, even if aimed at improving local livelihoods. A national campaign to increase agricultural output through regional crop specialization in Rwanda has undermined local control of land, making collective action to manage land-based resources virtually impossible (Pritchard 2010). In northern Myanmar, the process of formalizing "community forests," ostensibly to protect against the encroachment of agribusiness concessions, also extends state control over land and forests previously managed under traditional tenure (Woods 2010).

5. Influencing the action arena

The three entry points for engagement we outlined in Section 2 are interrelated. Effective support to natural resource management institutions that foster collective action often requires complementary work to advocate an enabling policy and legal framework. Interventions aimed at influencing the process of stakeholder interactions in specific domains of resource competition – the action arena – not only serve to equitably resolve the particular dispute at hand; they can also open up opportunities for longer-term institution building, shifts in power, and stakeholder relationships that influence prevailing governance arrangements over time. This section focuses on recommendations to influence the action arena by (1) shaping actors' narratives of conflict in ways that promote reconciliation and reduce future conflict risk, (2) supporting the rights of weaker groups to access justice, and (3) identifying and cultivating space for dialogue.

5.1. Shape collective narratives to reduce conflict risk

Collective narratives motivate collective action, both positive and negative. These "group stories" regarding who is to blame and why for certain contemporary or historical wrongs also influence a group's choice of action, whether aimed at cooperation, negotiation, or resistance (Malkki 1995). Collective narratives have particular salience in the context of natural resource conflict, as rural group identities are often interwoven with the resources a group depends on for its livelihoods (Unruh and Abdul-Jalil 2014; Colvin et al. 2015; Green 2015). Local politicians in conflict-sensitive environments are often adept at making and shaping these narratives to win the allegiance of their constituencies. Ethiopian political discourse, for example, has long described pastoralists as "primitive" and wasteful of natural resources, reinforcing efforts to convert them into sedentary farmers and legitimizing policies that transfer resource control to the state or international investors (Hundie 2008). Pastoralists, on the other hand, may invoke counter-narratives, appealing to traditional networks or the international indigenous people's movement to justify their resource claims.

Narratives are shaped by conflict, and can be purposefully influenced. Nuba ethnic identity in Sudan was quite amorphous until Nuba people were pushed out

of their lands by Baggara expansion, which made these horizontal inequalities a rallying point. Counter-narratives highlighting historical cooperation and mutual dependence have also helped to mute conflicts (Suliman 1999). International actions can also influence local resource conflict dynamics. The International Criminal Court indictment of President Bashir of Sudan, for example, motivated local Arab and nomadic secondary occupants to negotiate land disputes with sedentary agriculturalists displaced by civil war, anticipating future international decisions that could cast them as perpetrators of humanitarian crimes (Unruh and Abdul-Jalil 2012). In Sierra Leone, UN radio stations established during the peace process gave a voice to those who accused certain chiefs of prewar abuses involving land and labor, prompting new expectations for accountability of traditional leaders towards their constituencies (Unruh 2008).

Understanding the narratives different groups use to organize their grievances can help identify opportunities to promote cooperative solutions. With outside assistance, indigenous communities occupying large areas of rainforest in Brazil, Colombia, and Venezuela have positioned themselves as stewards of a global resource, period financial support through the UNDP and others under the Guiana Shield Facility strengthened their ability to fend off destructive local resource uses (Berardi et al. 2015). Social movements in areas such as women's or indigenous people's rights can also link with actors in local resource conflicts to help legitimize demands for equity, democratization and environmental accountability. In Ecuador, protest and activism focused on mining, environment and social justice became the impetus for a new Constitution that placed significant limits on mineral expansion (Bebbington et al. 2008). Engaging government actors is equally important, as their responses determine whether social movements yield democratic innovation – or repression.

5.2. Support rights and capacities of weaker actors to access justice

Reflecting power relations in society, many institutions involved in natural resource allocation and management exclude marginalized groups from decision-making based on ethnicity, caste or social class, and gender. Even where there are no formal barriers to participation, people may be excluded by distance, illiteracy, or lack of information on how to participate. Simultaneously, stakeholders typically face multiple channels for presenting their grievances or managing conflict (Sanginga et al. 2007; Nkonya and Markelova 2009). These include both statutory bodies such as local government or resource management agencies, religious or customary institutions, and informal networks among neighbors or kin.

While such institutional pluralism can create uncertainty, it also provides the opportunity for forum shopping – taking disputes to different authorities depending on the parties' knowledge of and (physical and social) access to different institutions, and their perceived effectiveness. For example, in a multi-country study of local water conflicts, Funder et al. (2012) found that elite dominance of local organizations often precluded poor people from effective recourse when their

water supplies were reduced by excessive withdrawals by powerful community members. They found local actors called on a sequence of third parties to address water-related problems, starting with the closest and then moving gradually – if need be – farther away from the community. When external agencies were called in, they tended to be those with broader mandates such as the district administration, not specific water-related organizations.

The limited ability of different groups to access and navigate these multiple channels restrains their choice of alternate courses of action. To begin with, people cannot appeal to institutions they do not know about. This is one reason for investing in legal literacy about formal law and other institutional arrangements, including international agreements, as well as formal and informal alternative dispute resolution bodies. Building such capacity requires that agents identify existing fora that people may resort to in disputes (Funder et al. 2012). Where marginalized groups gain access to decision-making and conflict resolution fora, they often need support to use this access effectively. For example, India's local governance system, Panchayati Raj, facilitates representation by women and lower status castes and tribes, which has strengthened the decision-making authority of these traditionally marginalized groups over natural resources as well as public investment funds. However, this did not happen automatically. Many of the successful cases involved training for women to know their rights and to speak effectively in public (Sharma and Sudarshan 2010).

5.3. Promote dialogue and negotiation to resolve resource conflicts

Efforts to engage disputing parties directly in structured dialogue and negotiation over resource conflicts can help lay the groundwork for subsequent cooperation, or at least reduce the risk of broader social conflict. Likewise, where resource competition is less acute, working with local groups to catalyze collective action to manage common-pool resources can reduce conflict risk over the longer term. A growing body of guidance is available on tools and approaches that have proven successful in strengthening collective action by working directly with stakeholders in the resource system at hand. These include: facilitating processes of prioritization, planning, and action; engaging in participatory learning and action; redesigning institutions and incentives; building trust and relationships among stakeholders; and harnessing social energy (Ramirez 1999; Poteete et al. 2010; Ratner et al. 2014; Rüttinger et al. 2014).

Colfer (2007) offers detailed guidance in the form of 23 "rules" for catalyzing collective action in natural resource management, which incorporate capacity for conflict management. The rules begin with understanding the local setting, the connections between the various aspects of local people's lives, and the contextual factors that influence their choices. This contextual awareness is important to jointly understand how conflicts emerge and the source of various parties' grievances. Subsequent rules offer guidance on engaging multiple sources of local knowledge, identifying shared goals, and building in mechanisms for assessing

the group's progress toward these goals. Other forms of guidance address how to establish links between various actors, how to foster leadership in both formal and informal roles, and how to seek justice via mutual understanding.

Many if not most conflicts have latent opportunities for fruitful negotiating space, whether these are visible to outsiders or not. In the Karamojong cluster in the border areas of Ethiopia, South Sudan, Uganda, and Kenya, governments and donors failed repeatedly to bring peace to the region and find a way for cattle herders to stop violent cattle raiding and derive workable arrangements for grazing access and use (Lind 2015). Yet, an unassuming veterinary project offered the necessary space for negotiation to mitigate conflict. The project provided a neutral, nonpolitical forum in which the different parties were able to engage each other, recognizing as well that the veterinary vaccination service would withdraw if instability continued (Muhereza 2001).

For development practitioners and civil society leaders working with communities in conflict-sensitive environments, identifying such openings to assist dialogue and negotiation within existing decision-making fora is key. In Zambia, for example, women widowed by AIDS have worked in concert with an opening created by statutory law and the chiefs to build a case for retaining land ownership – challenging customary law that favored relatives of the deceased male head of household (Frank and Unruh 2008). Post-conflict situations may create opportunities for women to claim stronger rights, either where they have played a major role in peacemaking and rebuilding (as in Rwanda and Liberia) or because high widowhood rates make it more critical to provide women with control of resources to secure livelihoods and household wellbeing (Hunt and Posa 2001; Powley 2003). Where scientists have information on resource status, uses, and the implications of different management options, making this available in a form that can aid dialogue and negotiation among local stakeholders is essential, as opposed to advocating fixed solutions (Giller et al. 2008; Cundill and Rodela 2012).

6. Conclusion

What role can collective action play in transforming competition over natural resources to strengthen social-ecological resilience and mitigate or prevent conflict? And what opportunities exist to promote such positive outcomes? In addressing these questions, we have framed our argument as a set of propositions and action recommendations rather than policy prescriptions. This reflects the broad scope of this review, as well as an appreciation for the need to adapt such recommendations in diverse social, cultural, institutional, and ecological settings. More important than fixed guidelines, we believe, is a practical awareness and sensitivity to the potential for positive influence on many fronts, and the range of contextual factors and institutional relationships that must be taken into account, by both domestic and international actors, in making choices about how best to intervene.

The options for engaging with these issues differ by actors, from local communities and private firms to national governments, international development agencies, regional organizations, and domestic and international civil society networks. By distinguishing three levels of intervention – from policies, to collective action institutions, to the more particular 'arenas' for negotiation and dispute resolution – we highlight opportunities for all of these actors, and at different stages of conflict intensity. In the face of apparently 'intractable' conflicts, an appreciation of these three windows for intervention can help identify suitable points for engagement that, in distinct but complementary ways, help shift the incentives towards equitable resource management and social-ecological resilience. Governance interventions addressing the broader policy and institutional context (Figure 2, window 1) are more likely to succeed when they build on an understanding of the existing mechanisms for tenure allocation and conflict resolution, as well as horizontal inequalities marked by ethnicity or religion that new policy measures could exacerbate or diminish. Efforts to strengthen collective action institutions for natural resource management (window 2) can contribute directly to increased capacity for conflict resolution, post-conflict reconciliation, and proactive conflict prevention. Lastly, a focus on the action arena for specific disputes (window 3) can open opportunities for more lasting institution building and new norms of cooperation by shaping collective narratives, strengthening the capacity of weaker actors to access justice, and demonstrating the gains from structured dialogue and negotiation.

By organizing research in this domain through the lens of a single analytical framework, moreover, we provide a structured basis for comparison, which can also serve for future, more focused analyses in specific resource systems and sub-regions, or for specific areas of intervention. For example, how can collective action be fostered to address the conflict risks related to climate change adaptation and mitigation in agriculture and forestry? What are the most promising interventions to build cooperation in restoring degraded lands and halting desertification? To what extent can investment in more equitable policies and institutions promoting cooperative use of resources for local livelihoods help reduce conflict and diminish the drivers for migration?

Advancing this domain of research and practice, however, requires more than a shared framework and comparative case analysis. Much more emphasis needs to be placed on monitoring and evaluation efforts. This means probing the linkages between discrete interventions and outcomes including resource status and trends, reductions in livelihood vulnerability and conflict risk, as well as increases in adaptive capacity and social-ecological resilience (see evaluative criteria of outcomes in Figure 2). Comparing these outcomes across a range of cases with different governance characteristics is essential to build our shared understanding of what specific strategies work under what circumstances, and to develop more specific guidance regarding each of the ten approaches summarized in this paper. This in turn can strengthen the rationale for policies and practices that promote collective action for equitable natural resource management as an essential investment in conflict prevention.

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