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Resource Conflict, Collective Action, and Resilience

An Analytical Framework

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ABSTRACT

In developing countries where access to and use of renewable natural resources essential to rural livelihoods are highly contested, improving cooperation in their management is increasingly seen as an important element in strategies for peacebuilding, conflict prevention, and longer-term social-ecological resilience. While researchers have made important advances in recent years in assessing the role of environmental resources as a causal factor in civil conflict, analysis of the positive potential of collective natural resource management efforts to reduce broader conflict is less developed. In particular, there is a need for analytical tools that not only describe stakeholder interactions and outcomes but also yield practical guidance on what development practitioners and policy makers can do to promote such goals. Addressing this need, we present a framework focused on the links between collective action, conflict prevention, and social-ecological resilience. Building on the institutional analysis and development (IAD) model, and incorporating principles from the sustainable livelihoods approach and resilience theory, the framework is applicable across multiple scales of analysis, linking local stakeholder dynamics to the broader institutional and governance context. Accounting for both formal and informal relationships of power and influence, as well as values and stakeholder perceptions alongside material interests, the framework aims to provide insight into the problem of (re)building legitimacy of resource management institutions in conflict-sensitive environments. We present the elements of the framework and outline its application in stakeholder-based problem assessment and planning, participatory monitoring and evaluation, and multi-case comparative analysis.

Keywords: Resource conflict, collective action, institutional analysis and development, social-ecological resilience, natural resource management

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Resource Conflict, Collective Action, and Resilience

An Analytical Framework

Blake D. Ratner,¹ Ruth Meinzen-Dick, Candice May, and Eric Haglund

1. INTRODUCTION

In developing countries where access to and use of renewable natural resources essential to rural livelihoods are highly contested, improving cooperation in their management is increasingly seen as an important element in strategies for peacebuilding, conflict prevention, and longer-term social-ecological resilience. There are at least three reasons for this.

First is a growing appreciation of the ways that competition over environmental resources can link to other social divides as a contributing factor in intrastate conflict. While interstate warfare has declined in recent decades, intrastate conflict is on the rise, most now centered in poor countries, with civilians as the primary victims (Collier et al. 2008). Loss of livelihood linked to environmental degradation and competition over access to and ownership of natural resources is a common contributing factor (UNEP 2009). Indeed, natural resources were implicated in up to forty percent of all intrastate conflicts in the past six decades (UNEP 2009).

Second is increased recognition of the role of violent conflict in undermining other areas of potential progress in development. The international development community is now grappling with twin challenges – how to provide effective assistance in conflict-prone environments, and how to ensure that development assistance reduces the risks of future conflict (Maxwell 2009). Because violent conflict frequently erases gains from prior development assistance, and because intrastate conflicts associated with natural resources are twice as likely to relapse into conflict within the first five years (UCDP 2008), these twin challenges are closely linked. Many of the burdens of violent conflict, moreover, extend far beyond the societies where they take place, frustrating progress towards global public goods including disease eradication, crime prevention, and international security (Collier et al. 2008).

Third is an emerging awareness of the positive potential that cooperation around natural resource challenges can offer in reducing the risk of broader social conflict and violence. While this rationale is not altogether new among advocates of public policy support for and investment in natural resources management (Tyler 1999), it is gaining traction in international development circles. The international development community has explicitly identified goals of improving governance as an essential contribution to managing conflict and reducing poverty (e.g., DFID 2007), and capitalizing on the potential for environmental cooperation as a contribution to peacebuilding (Feil et al. 2009; UNEP 2009).

Research on environmental resources and conflict has expanded rapidly in recent years, but important gaps remain in application to development policy and

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practice. Research on the causal links between competition over natural resources and violent conflict (Carius and Lietzmann 1999; Homer-Dixon 1999; Le Billon 2001; Le Billon and Springer 2007; Rustad et al. 2008; Welsch 2008) has focused largely on high-value extractive resources such as oil, gems, other minerals, and timber. Until recently, far less attention, in both research and public advocacy, has focused on conflict over the natural resources that underpin rural livelihoods in agricultural landscapes – the subsistence use of land, water, fisheries, and forests. The recent surge in international “land grabs” as countries and corporations aim to secure ownership or long-term use rights for agricultural land and primary resource extraction has increased attention to poor people’s resource rights and livelihoods in policy debates over food security and poverty reduction (Kugelman and Levenstein 2009). Climate change, with its associated shifts in resource productivity and migration patterns, the emergence of new markets for carbon offsets for forest and land management, and investment in biofuel production have highlighted additional sources of competition and potential conflict in renewable resource management (Barnett and Adger 2007; RRI 2010).

Furthermore, little progress has been made to understand how cooperation over natural resources may provide a buffer against conflict risks (Conca and Dabelko 2002), how governance factors can encourage pathways to constructive cooperation over natural resources (Martin 2005), nor how cooperative use of natural resources may provide a focal point for improvements in governance and peacebuilding more generally (Carius 2006). In their review of the state of the art of research on environment, conflict, and cooperation, Matthew, Brklacich, and McDonald (2004) argue that to address such factors rigorously, analysts need to better engage research traditions on the roots of conflict and the dynamics and processes of cooperation.

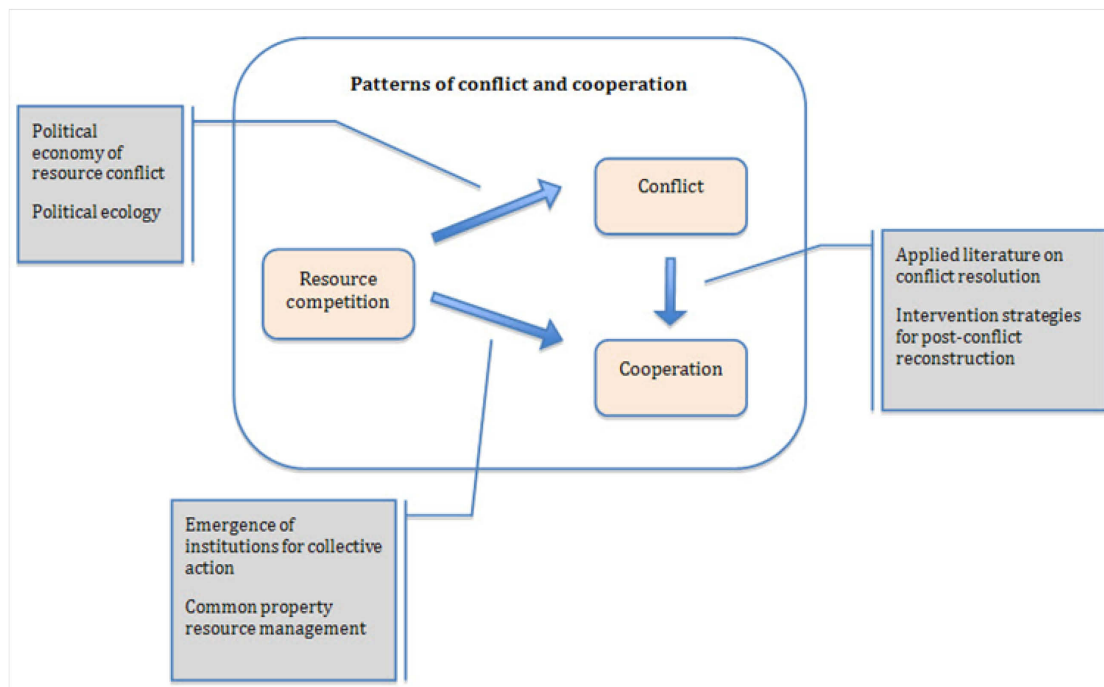
“Conflict” as used in this paper covers multiple levels of intensity from nonviolent disputes to sustained, violent conflict. The term “broader social conflict” is used to denote escalation in intensity beyond the local level, or extension in breadth (e.g., when resource-related conflicts become linked to other divides related to ethnicity, religion, nationality, or social class). While some degree of competition and conflict over environmental resources can be considered inevitable, the focus of our attention is finding ways to divert the progression from competition over resources essential to rural livelihoods to broader social conflict, including but not limited to violent conflict.

Considering that resource competition can either spawn broader, destructive conflict or renewed cooperation, we conceptualize these opposing potentials as a “fork in the road”. This simplification is not meant to imply that the choice is made just once or that it holds; rather, we are referring to a choice faced repeatedly by multiple stakeholder groups in different configurations over time.

But what explains such patterns of conflict and cooperation in response to natural resource competition? As summarized in Figure 1, different research traditions have focused on distinct parts of this problem. The emphasis in political economy analysis of resource conflict is principally concerned with the top arrow in the diagram—from competition to conflict (e.g. Homer-Dixon 1994, 1999; Collier and Hoeffler 2005; Le Billon 2001, 2005; Humphreys 2005); likewise the political ecology literature, which emphasizes the positive potential of conflict to spawn social movements or institutional changes that lead to more socially equitable forms

of resource use (e.g., Peet and Watts, 1996, Peluso and Watts 2001; Bohle and Funfgeld 2007; Cronkleton et al 2008). Most of the work on the emergence of institutions for collective action and self-governance is concerned with the bottom arrow—from competition to cooperation (e.g., Ostrom 1990; Lubell et al. 2002; Giordano et al. 2005). The applied literature on conflict resolution, as well as on intervention strategies for post-conflict reconstruction are concerned principally with the arrow on the right side of the diagram—from conflict to cooperation (e.g., World Bank 2005; Maas and Carius 2008; Ruckstuhl 2009; Conca and Wallace 2009; UNEP 2009).

Figure 1. Differing points of analysis in research traditions examining patterns of conflict and cooperation in response to resource competition.



Source: Authors.

This paper introduces an analytical framework that draws on insights from each of these research traditions. Our aim is to provide a common conceptual language to guide research on the role of collective action in cooperative management of renewable natural resources, conflict, and social-ecological resilience. Building on the institutional analysis and development (IAD) model (Ostrom 2005), and incorporating principles from the sustainable livelihoods approach and resilience theory, the framework is applicable across multiple scales of analysis, linking local stakeholder dynamics to the broader institutional and governance context. Accounting for both formal and informal relationships of power and influence, as well as values and stakeholder perceptions alongside material interests, the framework aims to provide insight into the problem of (re)building legitimacy of resource management institutions in conflict-sensitive environments. By offering criteria to evaluate the outcomes of patterns of conflict and cooperation,

moreover, we hope to embed the specific analysis of such patterns of interaction within the broader assessment of progress towards social-ecological resilience.

Our intention is that the framework be applied as a tool for analysis as well as an aid to intervention. As such we expect it to assist researchers undertaking comparative studies to synthesize experiences across multiple cases in a way that yields lessons for practitioners, helping to advance the field from broad claims to more nuanced specification of what factors are critical under what circumstances. We also expect that the framework, when adapted for application in the field, will be of direct use to development agencies and governments planning interventions in post-conflict settings or planning investments in agriculture and natural resources management to build resilience and reduce or mitigate future conflict, and to civil society organizations aiming to strengthen resource management institutions and improve governance in support of local livelihoods.

The paper is organized as follows. In section 2, we present an overview of our framework, along with its connections to other literature. This is followed by more detailed discussions of its main elements – the context (section 3), the action arena (section 4), patterns of interaction (section 5), and outcomes (section 6). We conclude by outlining the framework’s application in three domains: stakeholder-based problem assessment and planning, participatory monitoring and evaluation, and multi-case comparative analysis.

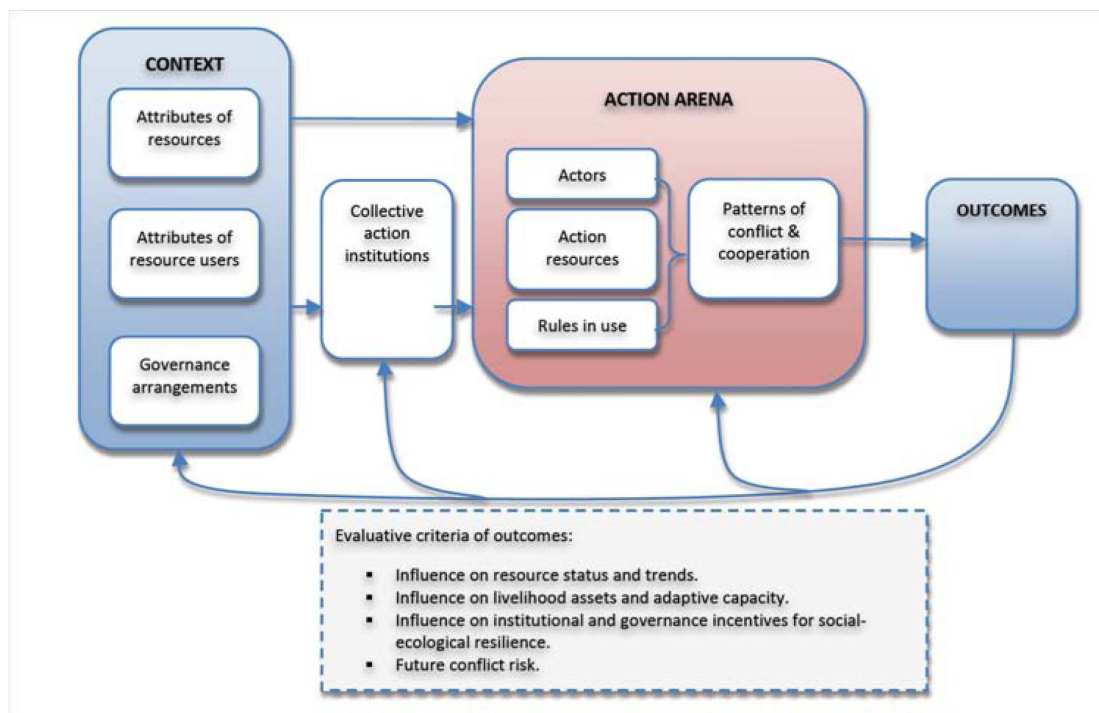
2. THE FRAMEWORK IN OVERVIEW

The framework elaborated below builds on the institutional analysis and development (IAD) framework (Oakerson 1992; Ostrom 2005; Poteete, Janssen and Ostrom 2010). We selected this framework as the foundation because it is highly adaptable, having been applied to a wide range of institutional analyses across different resource systems, and because it enables analysis of divergent outcomes, even if historically it has primarily been applied to understand the sources of cooperation. The framework has four main elements: the initial context influences an action arena, in which patterns of interaction are established, leading to certain outcomes. As such, it enables the analyst to incorporate key contextual factors without losing sight of the more immediate incentives that influence actors’ choices. Outcomes can be evaluated on a number of criteria according to the particular focus of analysis. As a dynamic framework, outcomes, in turn, feedback and influence the context and action arena in future rounds (see Figure 2). In the “classic” IAD framework applied to study the management of common pool resources (e.g. Oakerson 1992; Ostrom 2005), context incorporates three broad sets of factors:² 1) attributes of the resources, which describe biophysical conditions and trends; 2) attributes of the resource users, which encompasses both local communities and extra-local users; and 3) “rules”, which covers broad governance arrangements down to specific rules regulating use of a given fishery, forest, or pastureland, for example (Ostrom 2005; Ostrom et al. 1994). In applying the IAD framework to the study of poverty, Di Gregorio et al. (2008) break out the

² There are slight variations in the labels for various elements of the framework from one presentation of IAD to another. We use terms that we feel best fit the adaptation of the framework to address conflict situations.

contextual factors somewhat differently, highlighting the importance of risk, assets, and governance arrangements. Because of our focus on natural resource management as a means of reducing conflict, we use the “classic” IAD set of contextual factors. However, risk and assets are also very relevant for shaping conflict or cooperative outcomes. We therefore address these aspects under both the attributes of the resources and the attributes of community. Because of our particular interest in collective action, we follow the approach of Di Gregorio et al. (2008) in identifying collective action institutions as a separate box, which is both influenced by the other contextual factors, and influences the action arena. While collective action institutions could be considered as part of the governance arrangements (and collective action itself is one of the possible patterns of cooperation), we have created a separate box to indicate that the collective action institutions (such as kinship networks or resource user groups) are influenced by the attributes of the resource, the users, and the governance arrangements, and that these institutions, in turn, can play an important role in shaping the action arena.³

Figure 2. Conceptual framework on resource conflict, collective action, and social-ecological resilience. Adapted from Ostrom (2005) and Di Gregorio et al. (2008).



³An alternative way of viewing this would be to think of multiple action situations, or multiple rounds of analysis. In the first round, the outcome of interest is the emergence of collective action institutions. Once these exist, in subsequent rounds, these form part of the context, and the focus is on how competition for resources is managed; the outcomes of interest are the patterns of conflict or cooperation. However, we have put a separate box for collective action institutions so that these are kept in mind in the analysis.

Each of these factors of context can, in turn, be broken down into much more detailed elements, depending on the particular situation being examined (Poteete, Janssen and Ostrom 2010). In this paper, for each factor, we assess how particular characteristics shape the incentives for collective action to manage contested renewable resources cooperatively – or, alternatively, how they increase the incentives for broader social conflict and violence, as discussed in section 3.

An action arena can be a village, a court, even a single meeting—any stage for social bargaining on which different actors may choose to cooperate or not (Di Gregorio et al. 2008). Ostrom (2005) characterizes action arenas as being composed of an action situation and participants. Di Gregorio et al. (2008) further break this down into: 1) actors; 2) action resources; and 3) rules in use.⁴ We find that this characterization is useful for considering the dynamics of interactions that lead to either conflict or cooperation. By considering the characteristics of the actors involved in a particular resource conflict, the action resources they each have to influence others and pursue their objectives, as well as the constraints and opportunities provided by the broader institutional context that limit the choices they have available (see Section 4, below). The action arena concept invites stakeholders to reflect on what can be done, and how to shift the action resources available so that disadvantaged groups can indeed influence decision making more effectively in pursuit of equitable outcomes.

Patterns of interaction refer to the bargaining processes among actors in which they exchange resources, devise new rules, and demand action from other stakeholders (Di Gregorio et al. 2008). Given the focus of analysis for this framework, we have labeled these “patterns of conflict and cooperation,” but these are not discrete categories; interactions can include competition and collaboration as well. The outcomes of such interactions over time influence the broader institutional context. Of specific concern for our purposes, they influence the institutional and ecosystem characteristics that either contribute to social-ecological resilience or increase livelihood vulnerability and conflict risk.

Figure 2 presents this modified IAD framework, using Ostrom’s (2005) system for grouping contextual factors, but following the approach of Di Gregorio et al. (2008) in the action arena. In sections 3, 4, and 5 below, we explore the application of the IAD framework to examination of resource conflict and collective action situations. Before addressing each of these elements in detail, however, it is useful to outline what we consider to be some of the key distinguishing factors of the framework as a whole. This also serves to explain our rationale in proposing this modified framework.

Ostrom (2005) points out that one of the strengths of the IAD framework is that it can be applied at many different levels, from small groups to national or even international levels, depending on the boundaries of the action arena under study. This is valuable for study of conflict, which can occur—or be prevented—at many different levels. Sanginga, Kamugisha and Martin (2007) define three broad categories: community-level conflicts (opposing groups within local resource user

⁴ Poteete, Janssen and Ostrom (2010) identify seven attributes of the action situation, with each actor characterized by four clusters of variables that affect their preferences and strategies, but for our purposes we focus on the actors, action resources, and rules. Whereas most have the “patterns of interaction” as an outcome of negotiations within the action situation, we have, for simplicity, moved “patterns of interaction” inside the action arena and relabeled it “patterns of conflict and cooperation”.

communities); intercommunity conflicts (e.g., neighboring villages); and supracommunity conflicts (local communities vs. higher level formal institutions or other non-local actors). While all of these levels are important, our focus is on supracommunity conflicts, where resource competition is central to local livelihoods, yet finding solutions requires bridging ecosystem scales and nested levels of institutions.

But unlike most conflict analysis tools that begin at the national scale, our perspective builds up analysis from the local perspective, with its focus on livelihoods. In this, it also draws from the sustainable livelihoods framework, which focuses on the importance of factors creating vulnerability, the roles of different kinds of assets, and the effect of policies and institutions on people's diverse livelihood strategies (DFID 2001; Ellis 2000).⁵

Most research and policy attention has focused on the role of natural resources as a source of conflict; much less analysis and debate has focused on the dynamics of responding to resource conflict. A further advantage of our framework is that it recognizes the role of structural factors that can constrain or enable certain outcomes (the contextual factors), while the action arena highlights the importance of human agency. It therefore allows us to focus on capacity to respond to resource competition and conflict and seek out levers of change to allow disadvantaged rural people to increase their potential for positive action. As such, it reaches beyond the deterministic approach of many quantitative analyses of factors underlying civil conflict across a large number of cases (e.g., Collier et al. 2008, Franke et al. 2007).

A related advantage of the framework is that it puts an emphasis on actors' knowledge, perceptions and values, such that institutions that define the "rules" of interaction are considered socially-constructed and subject to change. Natural resources are often bound to social identities in complex ways. The historical, cultural, or symbolic importance of a particular resource may contribute to conflicts over its management, with competing groups invoking alternative narratives and ways of framing the problem (Long 1992). Conversely, conflict over a resource may become an element of a group's social identity (Green 2010). Research on common property institutions demonstrates that the level of trust that stakeholders have in institutions to mediate resource competition relates to the extent to which each has internalized shared norms and values; when shared norms and values are not internalized, greater levels of external enforcement are required (Baland and Platteau 1996). When existing resource management institutions are unable to address resource competition in developing countries, typically one or more factors are at play that reduce or negate their credibility and legitimacy in the eyes of key stakeholders. These factors include broader social transformations that undermine shared values among local actors, new resource claims by external actors that disregard local institutions, ecosystem linkages (such as upstream-downstream relationships) or market integration that extends the range of stakeholders with an interest in resource management decisions, and generalized discrimination or other failures in the effectiveness of government institutions.

⁵ There are similarities between the sustainable livelihoods and IAD frameworks: vulnerability context, assets, and the effect of policies and institutions of sustainable livelihoods relate to the contextual factors in IAD; livelihood strategies can be seen as an action arena, with livelihood outcomes comparable to the IAD outcomes.

This emphasis on group values would be naïve, however, if it did not also consider the power relationships among different actors (Edmunds and Wollenberg 2001). Access to livelihood opportunities is governed by social relations, organizations and institutions, in which power is an important explanatory variable (De Haan and Zoomers 2005). For example, Sietchiping's (2010) discussion of land access in Sub-Saharan Africa emphasizes the importance of local power structures in explaining inequitable land access and resulting conflicts. The natural resources management literature is often weak on consideration of power, which is by contrast the central focus of political ecology writing. Our framework therefore also draws on the political ecology perspective to recognize the role of power and negotiation to gain influence, leading to an emergent nature of governance (Wyckoff Baird 1998). This means that analysis of any situation has to recognize risks of power imbalance and deprivation, and also seek out institutional responses that help frame incentives for cooperation.

While a number of other research approaches focus on explaining a single outcome (the determinants of violent conflict or cooperation), our focus on collective action is designed to capture the contingent nature of group interactions. Collective action comprises any form of concerted group effort to achieve a shared goal. Collective action is often considered to fall in a normative-voluntary "third sector," distinct from coordinated wage labor (part of the private sector) or coerced action such as *corvée* labor (public sector, where coercion falls under realm of the state). However, as Oakerson (1986) notes, not all collective action is voluntary—rules may be imposed that require people to participate. Collective action is not necessarily positive: collective action may be discriminatory or even violent. In some cases, collective action of one group can exclude others and undermine larger community cohesion. Indeed many conflicts are the outcome of two or more collective action groups operating against each other.

A comparative analysis of recent cases of forest conflict in Asia highlights this potential of natural resource conflict to either strengthen or weaken collective action at the local level (Yasmi et al. 2010). In a set of forest conflicts between communities and outsiders—usually companies or government agencies—the authors note that some communities respond by acting collectively to assert the legitimacy of their common claim to the forest (e.g., Chandet et al. 2010) while others respond to outside pressure by organizing in sub-groups that deepen divisions within the community (e.g. Indriatmoko and Mwangi 2010).

Our concern is what works to foster collective action that supports livelihood security and social-ecological resilience, recognizing at the same time the potential for broadening social conflict that increases people's vulnerabilities. These characteristics of the framework we have outlined above—multi-scale application, a focus on the interplay of contextual factors and group agency, emphasis on stakeholder values, and consideration of contingent outcomes—enable one to analyze long-term processes of institutional change. By definition a process, not a state, collective action is facilitated and constrained by institutions. Over time it can also shift the institutional context, i.e., it can help establish or build the legitimacy of new institutions, and it can help strengthen existing institutions to be more responsive, equitable, and effective for resource management, conflict resolution, and governance. The challenge is to build enduring institutional incentives so that

multiple, complementary, legitimate channels exist to manage resource competition, making violent action less attractive.

3. KEY CONTEXTUAL FACTORS

In the modified IAD framework, context encompasses three types of factors: attributes of the resources, attributes of the resource users, and governance arrangements. In applying this framework to understanding the links between natural resource management and conflict or cooperation, we assess how each set of factors shape the incentives for collective action to cooperatively manage contested natural resources—or, alternatively, how they increase the incentives for broader social conflict and violence.

Attributes of the Resources

One of the first key characteristics of resources that affect the risk of violent conflict is whether the resource is renewable or not. The extraction of nonrenewable resources sets up a zero-sum game: what is taken today by one party depletes what is available for others or in the future. This is one reason why valuable non-renewable resources such as diamonds, minerals, or oil and gas are more strongly associated with violent conflict, compared to renewable resources. And even within a resource like diamonds, dispersed secondary diamonds from alluvial deposits are much harder to control, compared to primary diamonds found in underground diamond-bearing kimberlite pipes. This is one reason that the alluvial diamonds in Sierra Leone are more associated with looting and illicit trade that funded conflict, compared to diamonds from mines in Botswana, which are much easier to regulate (Lujala et al. 2005).

Scarcity (supply relative to demand) of any resource—renewable or not—creates pressure on a resource. Whether these pressures lead to conflicts or to greater cooperation cannot be determined a priori. Among renewable resources, the spatial and temporal distribution of the resource also matters. Highly dispersed resources are more difficult to exclude others from using. We would expect that the more predictable the resource, the easier it is to build institutional arrangements for its management (Agrawal 2001; Di Gregorio et al. 2008). At the same time, in many dryland areas with fluctuating rainfall, we find that the erratic physical environment has created pressure for people to develop higher-level institutional arrangements such as reciprocal land and water access in pastoral areas (e.g. Ngaido and Kirk 2001), and water shortages in Bali prompted efforts to get the traditional subaks (irrigation groups) to federate and negotiate with each other for sharing water along the river (Sutawan 2000). With climate change, hydrologic flows are likely to become even less reliable, creating additional pressures on the sharing arrangements. Thus, both long-term trends of ecosystem change and short-term shocks are relevant.

Observability of resource use is another factor that contributes to conflict mitigation by increasing transparency and reducing suspicion. Monitoring of others is one of Ostrom's (1990) design principles for successful management of shared resources, and this is much easier to do when there is observability. Activities such as night patrols of irrigation systems or fishing grounds are done to improve

monitoring, and build trust that rules governing the resource are being observed. Small size of resource units and well-defined boundaries of the resource—factors identified by Agrawal (2001), Ostrom (1980), and Wade (1988) as facilitating collective action—would similarly increase the observability and reduce the costs of monitoring resource use, so are likely to reduce conflicts.

In addition to renewability, scarcity, and observability, there is a long list of biophysical conditions hypothesized to facilitate coordination in resource management (see Agrawal 2001; Baland and Platteau 1996; Poteete, Janssen and Ostrom 2010). However, the relevant categories of resource traits will vary depending on the resource, region, and other contextual factors.

Attributes of the Resource Users

Among attributes of resource users, socioeconomic characteristics such as ethnicity, education, and wealth are particularly relevant for studies of conflict. These are often central to the identity of particular groups, which distinguish “us” from “them”, and therefore form the cleavage lines along which conflicts form. This is particularly the case where these different attributes are highly correlated, as, for example, when ethnicity is associated with different (and competing) uses of a resource, such as between pastoralists and farming communities. Areas with great heterogeneity along such types of identity factors are more likely to be prone to conflict. Stewart et al. (2008) draw on a detailed cross-country comparative case analysis to support the conclusion that the risk of violent conflict is increased in situations where multiple horizontal inequalities align, such as where ethnicity aligns with type or resource use or historical claims for resources. The full range of sources of group identity is relevant. We therefore need to ask where are the salient social divides in terms of ethnicity, religion, gender, economic class, etc., and how these align or not with group interests in natural resource access and use. Where multiple types of property rights institutions or claims overlap, there are increased opportunities for disjunctures among various social groups, especially where each appeals to a different type of customary or religious law as the basis for their claims on resources.

Nor should we view “communities” as static or undifferentiated; they consist of multiple identities and conflicting values and claims over the natural environment (Leach et al. 1999). For example, farmers with a shared interest in collectively managed water may compete over private land rights. The general literature on factors affecting management of shared resources (e.g., Agrawal 2001; Baland and Platteau 1996; Ostrom 1990; Wade 1988) posits that bounded groups with a shared identity and history of cooperation are more likely to engage in effective resource management.

Many of these factors are summed up in the notion of “social capital,” which includes mechanisms for bonding (social cohesion within groups based on ethnicity, location, religion, shared values, reinforced by working together), bridging (structural relationships or networks that cross social groupings, involving coordination or collaboration, social support, or info sharing), and linking (ability to engage with external agencies, especially between poor groups and those in authority, to draw resources or influence policy) (Pretty 2003). Although social capital is often assumed to increase cooperation, it is not always straightforward. Bonding social capital may reduce conflicts at the most local level, but may

contribute to conflict with other groups. Bridging social capital, that forges links between similar groups, can reduce conflict between communities. Linking social capital, that creates bonds with outsiders, may be important to mitigate broader social conflicts.

Another key aspect of resource users are their assets. The sustainable livelihoods approach stresses the importance of a range of tangible and intangible assets: natural, physical, human, financial, and social, which we categorize as attributes of the resource users (DFID 2001; Ellis 2000). Natural capital may, at first, seem to be part of the biophysical context, but we consider it as part of the characteristics of the users, because property rights are inherently social relationships. To be an asset there must be some form of property rights that connect that resource to a person or group. Property rights therefore “map” the natural resources into assets. Secure property rights are often held to be a crucial element in creating clear expectations and thereby reducing conflict. But the distribution of property rights also matters. Highly unequal property rights that deprive many people of even the basic means of subsistence can also lead to conflict, whether through large-scale revolutions (as in China or Nepal) or sabotage and localized use of “weapons of the weak” (Peluso 1992; Scott 1985) as in the Naxalite movement in India.

Other types of assets are also relevant for conflict and cooperation. Physical capital such as roads can connect people or bring them into contact and hence conflict. Weapons are themselves a type of physical capital. Human capital includes both education and health, as well as bodily strength. Livelihoods are the means by which households obtain and maintain access to the resources necessary to ensure immediate and long-term survival (Scoones 2009). The sustainable livelihoods approach links these assets to the implementation of livelihood coping strategies to manage risks and shocks. It also draws attention to the importance of livelihood vulnerability, which comprises the elements of exposure to risk, severity of risk, and capacity to adapt (Adger 2006). In general, we would expect that high levels of physical capital (e.g. roads, transport), human (education), and financial capital to allow people to diversify their livelihood strategies away from exclusive dependence on the natural resource base, which may reduce competition on the resource as a trigger for conflict, but it can also create different interests and values for the resource among different sub-groups, which can be another source of conflict.

Governance Arrangements

The third and final set of contextual factors in the IAD framework relates to rules. Rules that specify which actions are required, permitted or prohibited are generally nested. That is, it is typical for one set of rules to define how other sets of rules can be changed. Ostrom (1990) distinguishes three types of rules:

- Operational rules govern day-to-day decisions
- Collective choice rules affect how operational rules are to be changed, and who can change them, thereby indirectly affecting operational activities and results
- Constitutional choice rules are the rules to be used in crafting collective rules that in turn regulate the operational rules.

All of these types can be a source of cooperation in forming or enforcing the rules, or they can be a source of conflict. Widespread and violent conflict (such as civil war) can rupture the institutional structures for constitutional choice, causing lower order rules to also become less effective. Rules are also expressed more specifically through the institutions of collective action governing resource access and use, such as water user groups, forest management committees, community fishery organizations, and farmer cooperatives, to name a few. In some instances where local sources of legitimacy for these institutions remain strong, they can endure and remain functional even amidst a more generalized breakdown in governance (Adhikari and Adhikari 2010). To draw attention to the particular role of such collective action institutions, we have flagged them separately in the modified framework (see Figure 2).

In our modified framework, governance arrangements include mechanisms of representation of diverse groups in decision-making, distribution of power and mechanisms of accountability (Agrawal and Ribot 1999; Lemos and Agrawal 2006). These are mediated by formal (statutory) legal and political structures as well as customary and informal institutions. Whereas much attention in the natural resources management literature has focused on governance arrangements specific to the resource sector at hand, we argue that considering broad governance characteristics such as state capacity and legitimacy, rule of law, freedoms of expression and political organization, and protections on human rights is essential in conflict-sensitive environments.

Quantitative analysis across multiple country cases confirms the importance of resource governance for reducing the likelihood and intensity of conflict and as an investment in peace maintenance (Franke et al. 2007), but says little in the way of practical implications for how to do this. Our premise is that institutional innovations that enable diverse stakeholders to assess and manage resource competition equitably can help build resilience, including the capacity to adapt not only to current sources of conflict but also to future risks. The challenge is to identify how development interventions in the natural resource sectors can link with complementary efforts to strengthen the underlying role of equitable governance and secure rights as a foundation for resilient livelihoods (Ratner 2011).

By probing the interactions between generalized governance arrangements, ecosystem integrity, and the livelihoods and rights of resource users, we expect that considerable progress can be made in deriving lessons for both conflict prevention and recovery. As Khagram et al. (2003: 300), note, integrating insights from the human security and human development fields in mainstream development practice "move[s] the sustainable development field away from a primarily needs-based focus to a rights-based focus in the quest of improving opportunities and capabilities. The practical implication of this broadening is that civil and political rights along with economic, social and cultural rights become an integral component of the social pillar of sustainable development".

Bringing sustainability concerns to the human security debate also emphasizes cross-scale interactions and interdependencies, from intra-community to international. Many security studies focus on the national and international level, while many natural resources management studies focus on the farm, community, or local ecosystem. But when the sustainability and security fields are linked it

focuses action on the meso-level, seeking out institutional linkages that can help foster collaboration across scales and sectors.

Today it is widely acknowledged that the complexity of social-ecological systems necessitates varying degrees of multi-level, cross-scalar coordination between civil-society, private, and public actors in governance arrangements (Folke et al 2005; Lebel et al 2006). As Young (2006) points out, it is dangerous to focus attention exclusively on one level, leading to inappropriate analysis, and by extension, inappropriate institutional interventions. In resilience research, governance systems that consciously address scale issues and dynamic linkages across levels of political administration are hypothesized to be more successful at assessing problems and finding solutions that are more socially equitable and ecologically sustainable (Folke et al 2005; Armitage et al. 2009).

Important dimensions of resource conflict stem from institutional gaps. When authoritative hierarchies to enforce rules governing relations of state and remote agricultural communities are missing or inadequate, new institutions are required to bridge these gaps (Keohane and Ostrom 1995). In some cases this entails a re-assertion of prior institutions. In post-conflict East Timor, for example, when the newly independent government lacked the capacity to enforce its own environmental laws, communities revived a customary system of land management known as Tara Bandu that had been superseded by the forestry code during the Indonesian occupation (Miyazawa 2010). More often it requires institutional innovation – the creation of new institutions to address emergent challenges, or the adaptation of existing institutions to function in new ways.

Particular attention to boundary, or bridging, organizations (such as watershed committees or other multistakeholder platforms) is essential (Berkes 2009; Young 2006). These play an intermediary role between different social arenas, administrative levels, or geographic scales and (Cash et al. 2006) provide a forum for knowledge co-production, trust building, sense making, learning, vertical and horizontal collaboration and conflict resolution through collaborative learning processes (Cash et al. 2006). Bridging organizations encourage resource users to recognize the biophysical and social interdependencies related to natural resource management problems and negotiate methods of management (Ravnborg 2002). Community based organizations that were formed to manage local waterbodies and floodplains in Bangladesh, for example, have benefited from establishing networks across geographic areas and with other types of organizations. These networks facilitate the sharing of information and enable organizations to band together to resist pressures from powerful actors who threaten their livelihoods (Sultana and Thompson 2010). In other cases, NGOs or government agencies and “social entrepreneurs” may play this function. Research that probes the sources of effectiveness for bridging organizations in mediating across social divides to prevent conflict or promote reconciliation in the wake of conflict is an especially important priority in the search for practical guidance on governance interventions.

4. THE ACTION ARENA

The action arena is the stage for social bargaining on which different actors may choose to cooperate or not (Di Gregorio et al. 2008). We are particularly interested in action arenas dealing with resource competition and potential conflict.

Within these, it is especially important to consider the characteristics of the actors involved, the action resources they each have to influence others and pursue their objectives, as well as the constraints and opportunities provided by the rules in use, which provide the institutional context that limits the choices they have available. Action arenas may be defined at many different levels, from the household to international levels. However, these do not happen in isolation. Just as ecosystem interactions are linked processes across scales (MA 2003), so too are the processes of social bargaining over environmental resource use and access.

Actors

Actors may be individuals or collective entities, such as organizations, e.g. government departments, other state entities, private companies, or NGOs. Internal actors are those who are expected to follow the specific rule system that emerges from institutional bargaining, whereas external actors can influence the bargaining processes of institutions that define rule systems for other actors, but are not necessarily bound by the outcome (e.g. nonresident government or NGO officials). External actors may act as benevolent agents or as opportunistic rent-seekers. Particularly where participatory stakeholder dialogue is concerned, the roles of convener and analyst are not separate from but embedded within the action arena, which requires a reflective sensitivity to one's influence on power dynamics (Ramirez 1999).

The attributes of different actors are, in part, a function of the social networks they belong to and multiple roles they play. An actor's role within social networks is characterized by his or her relative interconnectedness (measured by the density of relationships), relative position (measured by their centrality within a network) and relative influence (Ramirez 1999). Each actor will have specific action resources, and possible choices about strategic behavior, that might take into account possible strategies of other actors. Change agents are those actors that can influence other actors towards a specific path of institutional change. Change agents can have positive and negative influences, and these influences may be intentional or unintentional. Identifying change agents, then understanding and influencing their choices, therefore becomes an especially critical challenge for development interventions aimed at improving resource management and reducing conflict risks.

Action Resources

Action resources are those intangible and tangible assets that give actors the capability for agency. Agency includes the ability to exercise livelihood choices, to participate in collective action at various levels, to influence other actors, or get involved in political processes. All the different types of assets can be considered action resources. In addition, Di Gregorio et al. (2008) discuss the potential role of a number of intangible action resources, including: information and the ability to process it; cognitive schemata, which define the borders of what is imaginable to an actor; knowledge that is used to justify their actions; social prestige; and, time. Forming coalitions (a form of social capital) also increases the action resources available to the actors involved. Action resources can be mobilized by insiders or outsiders to further their objectives. For example, in their analysis of how

communities in eastern Zambia formed bylaws to manage conflicts over land use, Ajayi et al. (2010) note the importance of the decision to engage with the traditional chiefs, who command a great deal of respect and lent legitimacy to the formulation of the bylaws. The Indigenous People's movement provides another example of how frequently marginalized groups have formed coalitions to increase their voice in both international and national forums.

Action resources are not distributed evenly or equitably. Wealth or status differences between households or between communities are relatively easy to identify, but even within a household or community, gender differences in action resources are quite important. Men and women have different roles and interest, different action resources available to them, different socially sanctioned norms of behavior, and different approaches to conflict or its resolution.

Rules governing the use of action resources

Action resources do not have a fixed value: they depend on the rules that apply in each action arena. Examining these "rules in use" helps identify the key action resources, and how this is likely to favor some actors and outcomes over others. In some cases, social prestige is very important; in others, current information or time is more important, etc. This offers two major strategies by which certain groups or their allies can try to get outcomes in their favor: either help strengthen their assets, or change the rules to favor the assets that they do have. If land ownership is required in order to have a "seat at the table" (e.g. for land use planning), then helping the landless could involve either obtaining land ownership for them or changing the rules such that participation in decision-making is not tied to land ownership.

Collective action can help in this, allowing groups to work together with other internal actors or with external allies to expand their claims (thereby converting social capital into other assets or changes in the rules). Ironside's (2010) description of land management in a remote Cambodian province demonstrates the importance of recognizing and supporting the rights of indigenous populations to increase their chances of negotiating with intensifying external claims on their traditionally-managed forests. This involves both bonding social capital within indigenous communities and linking social capital, working with external agencies such as IUCN. The indigenous people's movement provides a further use of bridging social capital to link indigenous communities worldwide to claim stronger property and territorial governance rights (stronger assets) as well as establishing the principles of free, prior, and informed consent for external uses of resources in indigenous areas—a rule change in their favor for negotiating with governments and private sector interests in natural resources in their areas.

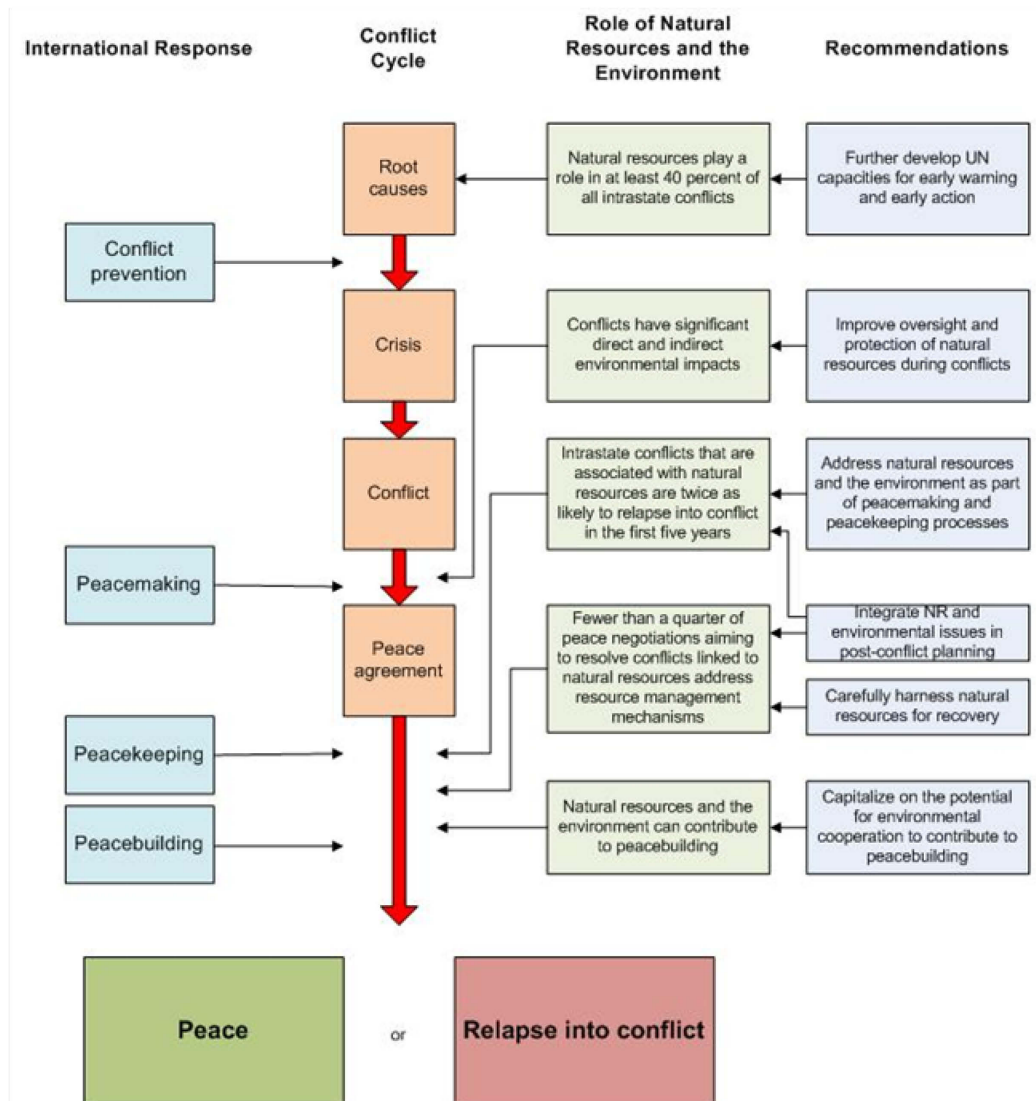
There is not one single or consistent set of rules governing the action arena. Rather, there is legal pluralism—the coexistence of multiple different types of rules: international, national, customary and religious law, project regulations, local norms, and even voluntary guidelines or corporate social responsibility standards—each backed by a different institutional framework (Meinzen-Dick and Pradhan 2002). Different actors appeal to different sets of rules, depending on which they know of, which institutions they have access to, and which they think will favor their interests to justify their actions. For example, Pradhan and Pradhan (2000) describe how different villages disputing over water in Nepal variously appeal to

government project rules, customary water sharing arrangements, and norms giving priority for drinking water to justify their claims to the resource.

Conflict may significantly alter the rules governing the use of action resources. Conflict is not uniformly destructive: it also opens opportunities for rapid gain by some, as well as possibilities of institutional reform. Based on research of the effects of war on livelihoods in Sri Lanka, Korf (2004) contends that war is both a serious threat and an opportunity for some when it comes to household strategies; whereas some households experience limited options, others gain access to more lucrative income sources. Unruh (2002) argues that post-conflict settings in particular offer opportunities for organizational, institutional, and policy reform in the formal and customary land tenure sectors.

External interventions to address conflict or prevent it likewise can fundamentally shift the rules in use that lend value to the action resources available to different actors. Consider the cycle of international interventions from conflict prevention to peacemaking and peacebuilding in post-conflict societies (see Figure 3). Not only is it important to recognize the role of natural resources as potential sources of conflict and opportunities for peacebuilding (UNEP 2009); we must recognize too that such interventions create and influence particular action arenas from local to international levels, reinforcing some decision-making processes and delegitimizing others. Analysts need to ask how such interventions contribute to shifts in assets across stakeholder groups, how conflict resolution mechanisms are made accessible to different user groups, and how this framing of action arenas affects actors' choices about pursuing cooperative problem-solving.

Figure 3. Role of natural resource management in cycle of interventions from conflict to peacebuilding.



Source: UNEP (2009)

5. PATTERNS OF CONFLICT AND COOPERATION

The action arena constitutes the immediate frame within which actors make choices about how to interact. The focus of this section is on the patterns of interaction that result from these choices. In particular, our concern is with the extent and nature of collective action that characterizes these patterns of interaction.

Sanginga, Kamugisha and Martin (2007) distinguish three broad categories of conflict management mechanisms, adapted from Means et al. (2003). These are customary approaches, legal and administrative mechanisms, and alternative conflict management systems. Each has its limitations. Customary approaches are often discriminatory and usually unable to handle conflicts among communities, with government, or across scales. Legal and administrative mechanisms are often

inaccessible to marginalized groups and unsuited to reaching cooperative outcomes in resource management. Alternative conflict management systems, which Sanginga and colleagues term the “synergy approach” are often stymied by power differences and sometimes applied without sufficient adaptation to the local context (See Table 1).

Table 1. Strengths and limitations of different conflict management mechanisms.

Conflict management mechanisms	Strengths	Limitations
Customary mechanisms	Encourages participation by community members and respect of local values and customs	Not all people have equal access to customary conflict management practices owing to gender, class, caste, ethnic or other discrimination
	Provides familiarity of past experience	Courts and administrative law have supplanted authorities that lack legal recognition
	Can be more accessible because of low cost, use of local language, flexibility in scheduling	Communities are becoming more mixed, resulting in weakened authority and social relationships
	Decision-making is often based on collaboration, with consensus emerging from wide-ranging discussions, often fostering local reconciliation	Often cannot accommodate conflicts among different communities, or between communities and government structures, or external organizations
	Contributes to a process of community self reliance and empowerment	
Legal and administrative systems	Officially established with supposedly well-defined procedures	Often inaccessible to the poor, women, marginalized groups and remote communities because of the cost, distance, language barriers, illiteracy and political discrimination
	Takes national interests, concerns, and issues into consideration	Judicial and technical specialists often lack expertise, skills or interest in participatory natural resource management
	Decisions are legally binding	
Alternative conflict management	Promotes conflict management and resolution by building on shared interests and finding points of agreement	May encounter difficulties in getting all stakeholders to the bargaining table
	Processes resemble those already existing in many conflict management systems	May not be able to overcome power differences among stakeholders in that some groups remain marginalized
	Low cost and flexible	Decisions may not always be legally binding
	Fosters a sense of ownership in the solution and its process of implementation	Some practitioners may try to use methods developed in other countries without adapting them to the local contexts
	Emphasizes building capacity within communities so local people become more effective facilitators and handlers of conflict	

Source: Adapted from Sanginga, Kamugisha and Martin (2007), after Means et al. (2003)

Our particular concern is how collective action can address the limitations of each of these mechanisms. In what ways can collective action help to shift customary conflict management approaches so that they are more inclusive, or link more effectively to formal administrative and legal processes, or engage actors at other scales beyond the traditional, local purview of customary institutions? In what ways can collective action increase marginalized groups' access to formal channels of administrative decision-making, legal reform processes, or access to justice through the courts? And, moving beyond the ad hoc interventions that typically characterize alternative dispute resolution with external facilitation or mediation, how can such approaches be institutionalized so that they become a feature of the prevailing governance framework?

Stakeholders may also choose not to engage in such conflict management mechanisms altogether. As Ramirez (1999) reminds us, that choice depends on an actor's calculus of anticipated benefit. In addition to joint decision making (which may employ any of the customary, administrative, or alternative mechanisms described above) or third party decision-making (which may rely on adjudication or arbitration through customary or formal legal and administrative channels), an actor may choose separate action. This may take the form of retreat (avoiding direct confrontation or downplaying the conflict), struggle (through violent or nonviolent means), or tacit coordination without direct agreement. Stakeholders choose to enter negotiation when they see the likely outcomes as favorable in comparison to what they could achieve by other means – the best alternative to a negotiated agreement or "BATNA" (Susskind and Cruikshank 1987). The BATNA and the decision of which strategy to adopt depend on the preferences of the actors and the action resources at their disposal.

Case studies illustrate this range of mechanisms in practice. Nkonya and Markelova (2009) use evidence from Uganda to demonstrate that the choice between customary institutions and formal state mechanisms for conflict mediation is related to the characteristics of the community and the source of the conflict. Watanabe et al. (2010) demonstrate the role of facilitated negotiation in the case of revenue sharing from gorilla tourism, which involves stakeholders from different communities, ethnic groups, and countries (Rwanda, Uganda, and the Democratic Republic of Congo). Ravnborg and Funder (2010) examine water related conflicts in five countries, focusing on the role and impact of third party involvement and particularly how it affects poor people's access to water. Chandet et al. (2010) discuss the relative outcomes from community mobilization in Cambodia through direct, nonviolent confrontation with agents of commercial land concessionaires as well as external mediation. These examples highlight as well the ways that the choice of alternative routes of action are not mutually exclusive – the same actors may shift strategies over time or pursue multiple channels simultaneously, and the outcomes from one approach may in turn influence the effectiveness of other mechanisms.

6. EVALUATING OUTCOMES

In evaluating outcomes from patterns of conflict and cooperation, we are particularly concerned with outcomes as measured in terms of livelihood security, resource sustainability, and adaptive capacity, as well as more fundamental shifts

to the institutional and governance context. These factors are seen to influence, in turn, the likelihood that future resource competition will be managed cooperatively, or whether it will spurn broader social conflict.

Livelihood security, resource status, and adaptive capacity

In many practitioner approaches to conflict management or resolution, the focus is on immediate perceptions of results—"success" is measured by the extent to which parties feel a decision or agreement is fair and responds to their expressed needs or interests (Fisher and Ury 1983). Without denying the importance of such process evaluation, our focus is on the way conflict management mechanisms in practice contribute to more enduring outcomes—not only the narrow interests of actors but also the broader social needs, desires, and values affected. (Pinzon and Midgley 2000).

In particular, our concern is with livelihood security, resource status, and adaptive capacity of actors. This combination of factors draws on the insights of resilience thinking, which views characteristics of linked social and ecological systems in tandem. Resilience is the capacity to absorb disturbances and reorganize while undergoing change to retain essentially the same function, structure, identity, and feedbacks (Walker et al. 2004). In our terms, this means principally sustaining the productivity of the resource systems at hand and the livelihood benefits these generate. Resilience ideas do not comprise a predictive theory; they constitute a framework or approach to understand complex social-ecological systems dynamics (Anderies, Walker, and Kinzig 2006). Rather than predict the impact of management actions, they are designed to improve management by focusing attention on particular system attributes that play important roles in social-ecological system dynamics so that guiding principles can be developed to improve long-term performance (Anderies, Walker, and Kinzig 2006).

While historically the resilience approach has been dominated by empirical observations of ecosystem dynamics interpreted in mathematical models, in recent years there have been advances in understanding social processes (Folke 2006). This includes examination of social learning (Garcia-Barrios, Speelman, and Pimm 2008), leadership, agents and actor groups (Fabricius et al. 2007), social networks, institutional and organizational inertia and change (Robards and Greenberg 2007), adaptive capacity, transformability and systems of adaptive governance that allow for management of essential ecosystem services (Gooch and Warburton 2009). However, there remains a need to further probe the role that conflict and responses to conflict play in contributing to or undermining resilience.

By conceptualizing the feedback loops linking outcomes of conflict and cooperation to the broader social, ecological, and institutional context, the framework developed in this paper aims to assist analysis of these links. Outcomes that affect resource status are conceptualized as shifts in the characteristics of the resources under analysis. Outcomes of collective action that affect livelihood security and adaptive capacity are conceptualized as shifts in characteristics of the resource users. A prominent notion in the resilience literature is that repeated efforts at collaborative management that engage the range of stakeholders across scales can serve not only social and ecological outcomes in the near term but can also improve the relationships among stakeholder groups and the capacity for learning and adaptation that is needed to address future stresses and shocks

(Daniels and Walker 2001). This capacity for learning and experimentation is also linked to the level of trust among actors engaged in addressing resource conflicts. Adaptive co-management draws explicit attention to the learning (experiential and experimental) and collaboration (vertical and horizontal) functions necessary to improve our understanding of, and ability to respond to, complex social-ecological systems (Armitage et al. 2009).

Structured processes of social learning involving collective action to address natural resource conflict, we posit, can improve institutional fitness to manage not only future resource conflicts but other forms of social conflict as well. The case of community forest user groups in Nepal (Adhikari and Adhikari 2010) offers an instructive example. Local institutions devised for the purpose of managing competition over shared resources remained effective in the context of a violent political conflict because of their adaptability to changing circumstances and their linkages across scales and levels of organization. Not only did they continue to provide an effective mechanism for forest management despite the failure of broader institutions of governance, but they served as well to moderate the effects of the broader conflict on local communities.

Shifts in institutional and governance arrangements and conflict risk

In addition to outcomes that affect the characteristics of the resources and resource users, it is important to evaluate how repeated responses to resource conflict affect the prevailing institutional and governance context. Here again, both positive and negative outcomes are possible: institutions and governance factors may promote social-ecological resilience and cooperative management of future conflicts or they may increase the risk of future conflict.

The international research community has a great deal to learn about how to distinguish these tendencies. There is no consensus, and comparative empirical analysis remains preliminary. Much of the research on the institutional aspects of resilience has focused on the characteristics of local resource management institutions that enable self-organization, learning and adaptation (e.g., Meinzen-Dick and Pradhan 2002, Berkes 2009). Less emphasis has been paid to the broader governance context that may encourage or discourage the emergence of such local institutions, and that influences how effectively competing claims on resources can be managed across classes of resource users, across sectors, and across geographic scales.

Beginning to address this gap, several recent contributions to the literature on social-ecological systems explore the governance context by proposing desirable characteristics of decision-making structures and processes that support or manage resilience. For example, Lebel et al. (2006) propose three positive attributes of governance: (a) participation and deliberation in building trust and common understanding about potential courses of collective action, (b) polycentric and multilayered institutions as enablers of decision-making that adapts to social and ecological change, and (c) accountability of public authorities as a determining factor in arriving at socially equitable outcomes. Critically, each of these describes attributes of governance in practice, which may vary greatly from the descriptions of decision-making or dispute resolution processes provided in policy or law.

Our concern is with such de facto characteristics of the institutional and governance context, and how these are influenced by the interactions among social

actors in response to resource conflict. For example, how does the inclusion or exclusion of certain groups in public decision-making processes reinforce norms of participation or, by contrast, institutionalize horizontal inequalities and grievances? Whereas vertical inequality is measured through differences in income across society, horizontal inequality concerns differences between groups, socially defined by region, ethnicity, religion, or class according to the most salient sources of group identity in a given society (Stewart 2000). Stewart et al. (2008) draw on comparative case study analysis to conclude that violence is more likely to be provoked when severe social-political and socio-economic horizontal inequalities coincide, providing elites within marginalized groups a strong incentive to mobilize their constituents and greater likelihood of gaining their support. They show as well, however, that proactive policies of social and political inclusion can reduce the likelihood of violent conflict. The implications for natural resource policy and management need further analysis.

How do the patterns of interaction among various formal and informal institutions affect their relative legitimacy in the view of different stakeholders, as well as the capacity of these institutions to negotiate differences or overlaps in jurisdiction, mandate, or decision-making authority? Adger, Brown, and Tompkins (2006) posit that the persistence and stability of governance arrangements depends on the distribution of benefits and costs from cross-scale linkages, demonstrated by the ability of various institutions to command legitimacy and trust among resource user and governmental stakeholders. Trust in this context is costly; it is built up through repeated interactions and can be quickly eroded when differences in power among stakeholder groups lead to gaps in access to information or decision-making. If government regulators, for example, mobilize information and resources from cross-level interactions to reinforce their authority, often other stakeholders such as resource users are disempowered (Adger, Brown, and Tompkins 2006). Bridging organizations take on special importance in this regard by providing opportunities for trust building through vertical and horizontal collaboration and collaborative learning processes (Berkes 2009; Young 2006).

How do the responses to resource conflict strengthen or undermine alternate mechanisms of public accountability? Here we have in mind both formal and informal routes of influence. For example, positive experiences of collaboration among local communities, corporate resource users, and government agencies may result in an increased willingness to pursue joint decision-making in other domains in the future, or may influence legislation outlining processes for environmental and social impact assessment of investment projects. Separate action to mobilize community grievances over resource conflicts through the media and public protest may broaden political support in a way that influences the emergence of new social safeguards in policy or law, or alternatively, may contribute to a crackdown on media and community-based organizations that becomes institutionalized as an enduring constraint. Frequently these outcomes may diverge from the aims of the actors involved. Woods (2010), for example, describes how the efforts of international NGOs in northern Burma to protect local communities from the encroachment of Chinese companies inadvertently help to formalize the government's authority over ceasefire areas where ethnic minorities have so far exercised a degree of autonomy and local control of resources.

7. APPLICATIONS

As stated at the outset, we intend this framework to be useful in improving both the understanding of the role of collective action in resource conflict and its outcomes as well as the practice of intervention to improve such outcomes at multiple levels. In this concluding section we outline three such applications: (a) stakeholder-based problem assessment and planning for development interventions and policy reforms, (b) participatory action research for monitoring, evaluation, and collective learning in ongoing initiatives, and (c) multi-case comparative analysis and synthesis of lessons.

While a range of generic conflict management approaches and guidelines exist, as well as several adapted to natural resource conflicts, most focus on the immediate dispute with relatively little treatment of the broader institutional context. Other analytical tools aim to identify emergent risks but offer little in the way of practical guidance. A notable recent advance aiming to overcome these shortcomings is the Environment, Conflict and Peacebuilding Analytical Framework (Maas and Carius 2008). Developed for use by environmental experts working with UN country teams designing post-conflict intervention strategies, the framework offers tools to help map existing resources, their uses and users, and their role in conflicts. What it does not yet offer is a process for engaging direct and indirect stakeholders in the analysis of risks and opportunities, including the scope for collective action that might reduce the risk of broader social conflict linked to resource disputes. Our hope is that the framework offered here will be adapted for such participatory problem assessments by drawing attention to the links between immediate sources of dispute and the broader contextual factors that increase or decrease conflict risk. In each case, an assessment of the contextual factors—characteristics of the resources and of the users, including the risks and assets, the governance arrangements, and collective action institutions—can help to anticipate the scope for conflict or cooperation. Examining the range of actors involved, the resources at their disposal, and the rules involved provides a structured way to understand solutions. Equally, the framework should aid joint planning building on such assessments to scope collective priorities for policy and institutional reform efforts, or for planning development interventions at national, sub-national, or regional scales. As such, the process of collective analysis and problem-solving can itself become an instrument of social learning.

Just as the framework can be applied to collaborative analysis and planning, we expect it will be able to enhance efforts at monitoring and evaluation of ongoing initiatives, again by broadening the consideration of contextual factors and collective action strategies. The resilience approach encourages practitioners to augment stakeholders' evaluation of outcomes in terms of their immediate interests to encompass a more integrated perspective on prospects for the social-ecological system as a whole and the longer-term implications for their own livelihood security. There is important scope as well for process evaluation, assessing the degree to which stakeholder interactions are contributing to social learning, building relationships and trust across social divides, and opening up opportunities for institutional innovation that facilitate positive expressions of collective action in the future.

In its application to multi-case comparative analysis, we expect the framework will yield lessons on the factors that influence collective action in resource conflict so as to refine our understanding of strategies that work in policy reform and development practice across a range of conflict sensitive environments. Although recent research on violent conflicts in developing countries has found that modern conflicts more frequently occur within rather than between states, the unit of analysis for many comparative studies remains the nation state (e.g., Collier et al. 2008). When the question at hand is not simply where conflict risk is high but also what to do in response, we need to shift the analysis to more fine-grained institutional dynamics. Our framework aims to fill this gap by viewing resource conflicts (and successfully avoided conflicts) as resulting from decisions made by resource users within a particular institutional and environmental context. By doing so, the framework provides a basis for comparison of cases that applies across multiple scales of analysis, rather than seeing conflict as a function of national-level characteristics. Likewise, it encourages analysts to explore the constraints of the institutional and governance context (structure) and the scope for actors to influence and shape that context over time (agency).

"NRM is in many ways a form of conflict management" write Sanginga, Kamugisha and Martin (2007). Indeed, natural resources management in fragile environments important to rural livelihoods necessarily involves negotiating some degree of competition—often intense and sometimes destructive—but it is also the source of remarkable cooperation. And while shifting demands on the resource base are certainly one important dimension of resource conflict, much more is at play than resource users simply following their material interests. Values, knowledge, power relationships, and institutional constraints are all important in framing actors' choices and justifying their actions. Our hope is that the framework elaborated here will be tested and refined to help researchers and practitioners alike to "un-pack" the dynamics of resource conflict and collective action, providing a common language to describe the problems at hand in a way that enables a shared search for solutions.

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