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# Adding Environment to the Collective Action Problem: Individuals, Civil Society, and the Mangrove-Fishery Commons in Ecuador

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**Summary.** — Research on the commons suggests a more robust understanding of human-resource interactions is needed to strengthen theories about collective action and sustainable governance. I combine ethnographic and fishery data to explore how resource characteristics and institutions influence people's behavior toward common pool resources in coastal Ecuador. This comparative study of the commons at two levels (mangroves and the cockle fishery) highlights how trust, communication, and social obligation depend on social histories of resource systems and types of collective action problems, largely explaining why local institutions encourage individuals to uphold mangrove forest conservation but have little effect on cooperation in fisheries.

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**Key words** — fisheries, collective action, commons, environmental governance, Ecuador, South America

## 1. INTRODUCTION

Research in sustainability science has emphasized that collective action plays a critical role in resource governance, resilience, and adaptation to various forms of environmental change (Adger, 2003; Adger, Hughes, Folke, Carpenter, & Rockstrom, 2005; Dolsak & Ostrom, 2003; Endter-Wada & Keenan, 2005; Kurien, 1995; Nelson, Adger, & Brown, 2007). Broadly defined as cooperation among individuals, collective action is often based on communication, trust, reciprocity, and a shared vision (Mosimane, Breen, & Nkhata, 2012; Ostrom, 1998; Ostrom & Walker, 2003; Smith, 2010). Successful coordination among individuals may prevent the scenario Hardin (1968) famously described as the tragedy of the commons, in which shared resources are overharvested by rational actors maximizing their personal gains. Four decades of research on the commons have largely debunked Hardin's assumptions by highlighting the ability of individuals and communities to self-organize for the governance of natural resources (Acheson, 2011a; Agrawal, 2001; Araral, 2009; Dolsak & Ostrom, 2003; McCay & Acheson, 1987; Ostrom, 1990; Ostrom *et al.*, 2002; Ratner, Meinzen-Dick, & May, 2013; Ruttan, 2006).

Common property theory has largely emphasized the role of institutions in mediating individual resource use (Berkes, 1996; Ostrom, 1990) and experimental research has advanced understanding about other conditions under which such forms of collective action are possible (Henrich *et al.*, 2005; Ledyard, 1995; Ostrom & Walker, 2003). However a general theory about individual decision-making within the context of common pool resource dilemmas remains poorly developed (Janssen, 2010). Despite the wealth of experimental research on collective action and case studies of common property institutions, surprisingly little attention has been given to the ways in which resource characteristics and ecological dynamics influence individual behavior (Janssen, 2010) or the creation of institutions (Agrawal, 2001, 2002). A more robust understanding of human–resource interactions is needed to strengthen theoretical propositions about collective action, group formation, and the sustainable governance of the commons.

The research presented here explores the influence of local civil society institutions on human–resource interactions in

the commons at two levels in coastal Ecuador: (1) the fishery for mangrove cockles (*Anadara tuberculosa* and *Anadara similis*), bivalve mollusks harvested from the roots of mangrove trees at low tide by artisanal fishers; and (2) its broader mangrove wetland habitat. For decades, the conversion of mangrove forests for shrimp farming in Ecuador has exacerbated harvesting pressures on many small-scale fisheries. Since the 1990s, a thriving civil society sector has grown out of grassroots resistance to shrimp aquaculture. At the same time, Ecuador has taken great strides in the direction toward participatory sustainable coastal management (Beitl, 2011; Guest, 1999; Olsen, Ochoa, & Robadue, 2003; Robadue, 1995). Mangrove deforestation rates have begun to subside since the year 2000 and some areas are showing signs of recovery (CLIR-SEN-PMRC, 2007). Presently, many local fishing associations continue to engage in activism concerning the defense of mangroves and some also work collaboratively with government agencies to address resource management and development issues in artisanal fisheries.

Despite the innovative policy interventions and the recovery of mangroves in some areas, the fishery for mangrove cockles continues to experience harvesting pressures (Mora & Moreno, 2009; Mora, Moreno, & Jurado, 2009, 2011). In 2001, the Subsecretaría de Recursos Pesqueros (SRP), a government regulatory agency, prohibited the harvest of shells smaller than 45 mm in length. These regulations are in line with customary norms by which fishers have traditionally left behind smaller shells in the mangroves to allow biological processes of larval dispersal, settlement, and growth. Members of fishing associations (hereafter referred to as *socios*) adamantly insist

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they are more “responsible” fishers than nonaffiliated cockle collectors because they obey shell size regulations and participate in workshops that increase awareness. Some government officials believe that mandating all cockle collectors to join associations would address problems of overexploitation. But many cockle collectors are wary of institutions and prefer not to participate (Beitl, 2012). Verifying popular claims about who engages in “responsible fishing” would not only settle the debate and inform fishery policies in Ecuador, but also contribute more broadly to theoretical understanding about the complex relationship between collective action and the environment.

This multi-sited comparative case study of two resource systems draws on ethnographic and fishery data to explore the general question: how do resource characteristics and the institutional context affect people’s behavior toward common pool resources? Specifically, I ethnographically explore the emergence of local associations of cockle fishers and other “ancestral users” of mangrove resources within the context of widespread environmental degradation associated with shrimp farming. I further examine how those local institutions influence human–resource interactions by statistically testing whether membership explains differences in (1) fishing behavior (measured by the average length of shells in each fisher’s catch); and (2) participation in activities that promote mangrove conservation (i.e., reforestation, activism). These two measures of human–resource interactions represent two different kinds of collective action problems, which may partially explain why local institutions successfully encourage participation in management regimes that uphold the mangrove commons but seem to have little effect on cooperation in the fishery commons. Understanding such mixed effects of collective action behaviors in different resource systems further contributes to knowledge about the interaction between other outcomes like ecological sustainability, livelihoods, and equity, which is of increasing interest in the literature on common pool resource governance (Agrawal & Benson, 2011; Persha, Fischer, Chhatre, Agrawal, & Benson, 2010).

## 2. COLLECTIVE ACTION, INSTITUTIONS, AND ENVIRONMENT

Global trends of population growth, urbanization, and rising market demand for seafood products have been transforming coastal zones and artisanal fisheries throughout the developing world for decades. Coastal mangrove forests have been among the most vulnerable forest types to such forms of global change for their widespread undervaluation that has often led to their conversion to other uses like shrimp farming (Alongi, 2002; Cormier-Salem, 2006; FAO, 2007; Martinez-Alier, 2001; Valiela, Bowen, & York, 2001). The social and ecological impacts of shrimp aquaculture such as landscape transformations, community displacement, livelihood loss, the erosion of resource rights, and conflict, have been well-documented in the literature (Cruz-Torres, 2000; Deb, 1998; Dewalt, Vergne, & Hardin, 1996; Gunawardena & Rowan, 2005; Martinez-Alier, 2001; Meltzoff & LiPuma, 1986; Primavera, 1997; Stonich, 1995; Stonich & Vandergeest, 2001; Veuthey & Gerber, 2011). Such chronic environmental degradation increases vulnerability in coastal areas and threatens resilience (Adger *et al.*, 2005), or the ability of a social–ecological system to learn, adapt, reorganize, and maintain its identity in the face of change (Berkes, Colding, & Folke, 2003). However, in some places around the world including Ecuador, coastal communities have empowered themselves,

engaged in collective action, and formed coalitions of resistance to defend livelihoods and the environment where property rights have been poorly defined (Martinez-Alier, 2001; Stonich & Bailey, 2000; Veuthey & Gerber, 2011).

### (a) *Civil society as collective action institutions*

Civil society plays a pivotal role in environmental issues of the new millennium (Little, 1999). It is often well-positioned to negotiate and advocate rights-based approaches to resource management and sustainable development, especially in places where commercial interests are privileged over local wellbeing (Johnson & Forsyth, 2002) or where government agencies are unable to adequately meet local needs. On the Ecuadorian coast, many civil society organizations were born out of a struggle between artisanal fishers and shrimp farmers over access to resources. In the early 1990s, extensive mangrove deforestation in Ecuador provoked outrage among activists and communities who began to mobilize in response. Muisne, one of the study areas for this research in the northern province of Esmeraldas, has been an important center for collective action and grassroots resistance to the shrimp industry when a group of youths formed a local nongovernment organization (NGO) in the early 1990s (Veuthey & Gerber, 2011). This NGO has played an instrumental role in helping communities organize into associations of ancestral users. Now internationally connected, the NGO continues to work with associations throughout the Muisne–Cojimíes Estuary to lead community development projects, network with other “ancestral user” associations in other provinces, and create national and international awareness campaigns for mangrove conservation, social justice, and the defense of livelihoods.

Similarly, in the southern province of El Oro, several communities throughout the Archipiélago Jambelí also began organizing in the early 1990s to gain government recognition of their “right to work” as artisanal fishers in the face of the rapidly expanding shrimp industry. Particularly in the south, one important benefit of creating associations and cooperatives has been increased access to government and nongovernment agencies for technical and financial assistance, such as loans and subsidies for economic development in rural coastal communities. Several local associations are now members of an umbrella federation of artisanal fishing organizations of the south, which is nested within a larger, national federation that works closely with government agencies to organize meetings and events that facilitate participatory practices in fisheries and coastal management. Such cross-scale institutional linkages are often considered an appropriate approach to managing complex social–ecological systems like fisheries (Berkes, 2002).

In the last decade, local institutions have gained more government and international support, which has fostered local empowerment and allowed for new forms of social–ecological change on the Ecuadorian coast. The new Presidential Decree 1391 calling for a regulation of the shrimp industry will most likely create more opportunities for cross-scale collective actions and collaboration between multiple sectors for the recuperation of lost mangrove habitat.<sup>1</sup> Under the new institutional arrangements that emerged from this policy, shrimp farmers have already begun to sponsor reforestation projects carried out by local associations and other civil society organizations, in which mangrove planters are often financially compensated for their participation. It is expected that such efforts will restore many of Ecuador’s degraded coastal wetlands that were converted for shrimp farming during the 1980s and 1990s.

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