



Tracing social capital: How stakeholder group interactions shape agricultural water quality restoration in the Florida Everglades



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ABSTRACT

Agricultural nonpoint source pollution remains a pressing environmental problem despite decades of policy and environmental initiatives. Cooperative local actions are a crucial element of effective multilevel governance solutions to such problems, but securing farmer participation for water quality protection remains challenging. Social capital—relations of trust, reciprocity, and shared social norms within and between key stakeholder groups—has been found to enable cooperation for environmentally desirable outcomes. However, the downsides of social capital remain under-examined in multilevel governance, where cooperation within one stakeholder group (bonding social capital) may undermine cooperation with other stakeholders (bridging social capital). Given this important gap, researchers need to examine how bonding and bridging social capital may be formed, maintained, or undermined through stakeholder interactions, and the corresponding environmental consequences.

In this paper, we address these gaps through a case study of south Florida's sugar-producing region, whose drainage water flows south into the Florida Everglades. In contrast to persistent water quality impairment elsewhere, Everglades water quality has improved steadily over the past 20 years. These improvements have taken place under a complex set of governance arrangements that established a mandatory long-term numeric water quality target but which relies on shared compliance among farms. These dynamics encouraged interactions among three key groups of stakeholders—farmers, agricultural extension agents, and state regulators—to implement management changes. Drawing on semi-structured interviews, we find that bonding social capital among farmers encourages them to improve their management through a sense of shared responsibility, while also potentially limiting restoration by maintaining perceptions that the regulations are unfair. Bridging social capital helps to legitimize new management efforts, while court-mandated water quality targets incentivize farmers to draw on multiple forms of social capital. We also discuss the relevance of this case for governing agricultural nonpoint source pollution in similar settings elsewhere.

1. Introduction

Water quality impairment from agricultural nonpoint source pollution remains a pressing environmental challenge worldwide, despite decades of voluntary and regulatory on-farm conservation efforts (Carpenter et al., 1998; Patterson et al., 2013; Ribaud, 2015). Research in environmental governance has emphasized cooperation at local levels as an important alternative or necessary complement to government regulation (Dietz et al., 2002; Marshall, 2008). Farmer cooperation and participation in adopting new management practices is essential to reduce nonpoint source pollution. However, it remains largely missing due to multiple factors, such as economic costs, conflicts with downstream stakeholders over balancing agricultural production

with nature conservation, and a lack of governance arrangements that promote collaboration among farmers (Smith and Porter, 2010; de Loe et al., 2015; de Krom, 2017; Leventon et al., 2017). Researchers have emphasized building social capital as a means to facilitate cooperation and overcome conflicting priorities between stakeholders in multilevel governance (Brondizio et al., 2009; Atwell et al., 2010; Marshall et al., 2016). Social capital, often defined as the value of trust, expectations of reciprocity, and shared social norms embedded in social networks, has been theorized to reduce the transaction costs of cooperation for environmental protection (Ostrom, 1994, 1999; Ballet et al., 2007).

Yet, a critical need remains to examine the merits *and* limitations of social capital in multilevel environmental governance (Crona et al., 2017; Ballet et al., 2007). By multilevel, we refer to the definition by

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Gibson et al. (2000) where levels refer to hierarchically organized positions located along a given spatial scale. For example, a farmer tilling a field occurs at a lower level than government officials overseeing regulations for a watershed. While the negative consequences of social capital have long been recognized, where trust or loyalty within one group may exacerbate conflicts with outsiders (Portes and Landolt, 1996), the downside of social capital has not been examined adequately (Ballet et al., 2007). In multilevel governance research, an increasing number of studies have found that social capital is not consistently correlated with improved environmental outcomes (Gibson et al., 2005; Bodin and Crona, 2008; Kizos et al., 2014; Suharti et al., 2016; Warren, 2016; Crona et al., 2017).

Since voluntary farmer conservation efforts have been insufficient to improve water quality, it is plausible that social capital within farming communities may work against building social capital with other stakeholders, such as government actors or environmental organizations, that may advocate for farmers to incur greater costs to ameliorate nonpoint source pollution. To understand whether social capital is likely to facilitate cooperation across stakeholder groups, research needs to focus on how diverse forms of social capital may act in mutually reinforcing or contradictory ways (Patulny and Svendsen, 2007). Many studies employ categories of bonding (within-group) and bridging (between-group) social capital to distinguish between different forms of social networks and the degree to which trust, expectations of reciprocity, and shared social norms are likely to facilitate cooperation (e.g., Woolcock, 2001). Despite the recognition of these distinct forms of social capital, we lack clarity on how their interaction affects participation in multilevel systems for improved environmental protection or restoration (Nenadovic and Epstein, 2016). Related, as Crona et al. (2017) have argued, research on social capital in multilevel governance has largely focused “on what it is, rather than what it does” (p. 71, emphasis in original). This can be problematic because social capital has been used as an umbrella term to represent a suite of pro-social behaviors that does not necessarily capture the reasons why actors form, maintain, or avoid connections within or between different groups. Thus, understanding the underlying social processes is crucial to explaining why bonding or bridging social capital facilitates or undermines cooperation across distinct locational and social-environmental contexts.

In this paper, we examine how bonding and bridging social capital among three sets of stakeholders in the Everglades Agricultural Areas (EAA)—farmers, agricultural extension agents, and state regulators—facilitates cooperation to change agricultural water management and improve water quality of the Florida Everglades. The case stands out as an uncommon success story because water quality in the region has improved continually over the past 20 years (Davison et al., 2017), in contrast to ongoing water quality impairment in many other agricultural areas (Patterson et al., 2013). Using qualitative, semi-structured interviews, we investigate: how farmers drew on and shaped bonding social capital; whether bridging social capital between farmers, extension agents, and regulators encouraged farmer cooperation or attenuated the potential negative consequences of bonding social capital; and how regulations mediated the use of these different forms of social capital. We discuss the implications of this case for understanding how and where governance interventions focused on networking actors and developing social capital within and across levels may achieve improved environmental outcomes.

2. Background: Bonding and bridging social capital in multilevel governance

A key concern of research on multilevel governance is to advance understanding of how connections within (bonding) or between (bridging) social groups can help to facilitate cooperation or undermine it (Brondizio et al., 2009). This is especially challenging given competing priorities among stakeholders, differing perceptions of environmental

problems and the associated distribution of benefits and costs, and the mismatch of spatial scales between governance arrangements and ecological functions that can shape incentives for cooperation (Cash et al., 2006; Brondizio et al., 2009; Leventon et al., 2017). The categories of bonding and bridging are based on the expectation that affiliations, loyalties, and obligations facilitate greater openness or potential exclusivity of social connections (Patulny and Svendsen, 2007). Bonding social capital reflects connections within groups, such as those based on kinship relations or other social networks where entry into or exit from the group is difficult. In these groups, social capital can involve enforceable trust or solidarity, which could lead to positive or negative contributions to society (Portes, 1998). In contrast, bridging social capital emerges from ties between individuals that belong to separate groups, when entry and exit is more fluid or groups are more outward looking (Patulny and Svendsen, 2007). Multiple studies have pointed to the need to analyze the interplay between these different types of social capital, though few studies have done so explicitly (Patulny and Svendsen, 2007). The bonding-bridging dichotomy helps to highlight where differing sets of relationships may enable or hinder cooperation (Westerink et al., 2017).

Multilevel governance research has demonstrated that social capital is not consistently correlated with improved environmental outcomes. These findings make it important to better understanding how and why actors seek out and draw on different forms of social capital. Several studies point to bonding social capital as undermining the willingness of actors to enforce rules that prevent environmental overuse or degradation (Gibson et al., 2005; Bodin and Crona, 2008; Warren, 2016). Other studies have demonstrated that high levels of social capital still need to be activated through leadership (Suharti et al., 2016; Crona et al., 2017) or through connections to political power or financial resources (Harrison et al., 2016). De Krom (2017) found that even in situations where collaboration is promoted, farmers sought to build bridging social capital with non-farmers to limit the intrusion of nature conservation into agri-environment programs. At the same time, farmers maintained bonding social capital around efforts to increase the agricultural productivity of the land.

Moreover, studies have demonstrated that unintended consequences of multilevel governance arrangements can undermine social capital among natural resource users. Kamoto et al. (2013) found that poorly planned devolution of forest governance rights to local villages allowed well-connected community members to opportunistically benefit from timber sales. This in turn undermined bonding social capital within the community because of the mistrust it created. Kizos et al. (2014), similarly, found that E.U. subsidies exacerbated preferences of Greek herders to increase stocking densities unsustainably because of the political value of large herds within extended kin networks. In turn, the overgrazing of larger herds caused tensions with farmers over land use, undermining longstanding bridging social capital since subsidies freed herders from relying on farmers for feed during transhumance.

Despite these different dynamics and outcomes, it remains clear that bonding and bridging social capital play critical roles in multilevel governance outcomes and their joint effects must be better understood. In this paper, we examine the potential synergies and tradeoffs from bonding and bridging social capital for restoring Everglades water quality. We address three research questions: (1) Does bonding social capital among EAA farmers support or undermine cooperation to restore water quality? (2) In what ways does bridging social capital among farmers, agricultural extension agents, and regulators encourage farmer cooperation? Lastly, (3) how do regulations incentivize farmers' decisions to draw on or create bonding or bridging social capital?

3. Study area background: Regulating water management in South Florida's sugarcane region

The EAA is an administratively defined area of south Florida that covers 500,000 acres in West Palm Beach and Hendry Counties (Fig. 1).

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