



A continuum of governance regimes: A new perspective on co-management in irrigation systems



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1. Introduction

Over the past, natural resources have been managed to a large part by the state. However, local communities increasingly account for a substantial share of management as well. Approximately 76% of the world's irrigated area (277 million hectares, 40% of the world's food production), is managed by local Water User Associations (Garces-Restrepo et al., 2007).

Since state-governance did not always meet expectations in the 1960 and 1970s (Acheson, 2006), many countries increased the involvement of local resource users in the management process (see Garces-Restrepo et al., 2007 for irrigation). This development led to a variety of different forms of collaboration between governments and communities. Indeed, despite the conceptual distinction, in practice there is considerable overlap between state and community-based governance and a wide diversity of experiences (Meinzen-Dick, 2014). Different ideas have been used to coin these experiences, including joint management, *community-based management* (Gruber, 2008), *(adaptive) collaborative management*, and, most prominently *co-management* (Armitage et al., 2009).

Despite some indications that co-managed regimes lead to positive ecological and social outcomes (Gutiérrez et al., 2011; Meinzen-Dick, 2014), there is still little more than rudimentary knowledge about the conditions under which the sharing of power between central government authorities and local communities is more efficient than either state governance or community governance systems on their own. However, some system attributes have been pointed out to affect performance,

among them size, monitoring and trust (Frey and Rusch, 2013). Other studies have pointed out that larger and more complex systems may be better served by government regimes (Schlager, 2007; Ross and Martinez-Santos, 2010). The general argument is that the greater the scale, the more coordination and expert knowledge is needed. For this purpose, state-governance may be suited better. Which institution is most appropriate often depends also on the particular local conditions in place (Meinzen-Dick, 2014).

Assessing co-management regimes faces a specification problem. There is a variety of definitions of co-management depending on how scholars understand the division of labor between states and communities (Berkes, 1994; Carlsson and Berkes, 2005; Plummer and Fitzgibbon, 2004; Yandle, 2003; Singleton, 1998). Relevant processes are, for example, institution building, power sharing, building social capital and trust (Berkes, 2009). In particular, emphasis is put on the dynamic nature of interactions between state and communities (Olsson et al., 2004; Plummer and Armitage, 2007; Berkes, 2009). Moreover, co-management is rather a continuum of governance regimes than a particular form. Comparing different types of co-managed regimes may thus require looking at the particular aspects that define those regimes.

This paper aims to move towards a diagnostic approach to co-management research by analyzing specific processes and aspects upon which state and communities divide labor and coordinate. The paper is thus concerned with the relevance of different specifications of co-management rather than testing whether “co-management” works at large. For this purpose, we explore performance implications of using different classifications of governance systems along the state-only to the community-only continuum. We define these classifications based on sets of variables that inform about how labor is divided between the state and a particular community. We are aware that there are other

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dimensions of structuring governance, e.g. state-markets-community or collaboration and coordination as well as top-down and bottom-up.

In theory, states and communities divide labor with regard to a large number of processes and aspects. In practice, however, we expect that there is a limited diversity in the way of dividing labor which makes a difference in performance. In addition, we expect that fine-grained classifications (i.e., classifications based on the observance of a large number of variables) contain fewer cases in the state-only and community-only classes and more cases in-between. Finally, we expect classifications to capture performance differently—always depending on evaluation criteria.

We focus on irrigation systems, since they are a paradigmatic example of the evolution of management paradigms in common pool natural resource management—starting with technology-centered state-governed approaches until the 1970s. In the 1980s and 90s, the focus shifted towards local management regimes, including co-management and complete devolution to community based resource management (CBRM) (Plusquellec, 2002).

The article is structured as follows. In the next section we review a selection of co-management definitions and the different aspects at which they look. We then provide a short overview on the state of the art concerning performance of natural resource management regimes across different sectors. This is followed by details on the background of this study. The methods section describes how both co-management and performance is operationalized in this study. In the results, we present a comparison of classifications and performance. These results are analysed in the discussion, followed by a conclusion.

1.1. Classification of co-management as a continuum

Co-management is contrasted to state-governance by a sharing of power and partnership for complex governance issues instead of a top-down approach by the state alone (Berkes, 2009). The latter has clear limits (Armitage et al., 2009). In co-management, multiple interests and agencies are usually involved. It has also been contrasted to community-based management by emphasizing the positive role of the state, e.g. subsidies or large-scale technical and administrative help (Ostrom, 1992; Anthony and Campbell, 2011). Ideally, co-management may combine the strengths and mitigate the weaknesses of each partner (Singleton, 1998).

Different definitions reflect different understandings about why co-management may be more suitable than community-only or state-only management. Some definitions highlight that the state and communities share responsibility and power over the management of the resource (Berkes, 2009; Berkes, 1994; Pomeroy and Berkes, 1997). As put by the World Bank, co-management is about

“[...] the sharing of responsibilities, rights and duties between the primary stakeholders, in particular, local communities and the nation state; [it is] a decentralized approach to decision making that involves the local users in the decision making process as equals with the nation-state” (World Bank, 1999).

Other, more specific, definitions focus on the possibility to create synergies in the division of labor between state and communities. Koontz (2004) and Anthony and Campbell (2011), for example, highlight different ways states can complement community-based management regimes, from providing financial resources and incentives to using coercion and organizing spaces for information sharing among communities.

In recent years, studies focusing on the adaptive capacity of co-management regimes (Costanza, 1998; Berkes et al., 2003) have partly merged with co-management-approaches (Plummer and Armitage, 2007; Folke et al., 2002).

Regardless of definition, most authors emphasize the existence of a *continuum* of governance regimes in which management responsibilities are shared, i.e. allocated, to communities and/or state. In the majority of cases, however, this is neither spelled out in detail nor operationalized in any way. We return to this in the Methods section.

1.2. Co-management regimes and performance

Despite much recent research and some indications that co-managed regimes lead to positive ecological and social outcomes (Gutiérrez et al., 2011), it is still unclear whether this is a robust result. This might be related to the classification problem of co-management itself, mentioned above. Different understandings and operationalizations of co-management may result in different findings about performance.

Numerous advantages have been associated with co-management as compared to state-management: First, a *greater sensitivity to local conditions*, resulting in more sustainable harvesting, *improved compliance* through better monitoring, peer pressure and making use of local knowledge (Gutiérrez et al., 2011). Second, a *higher legitimacy*, creating incentives to comply with rules without external sanctioning (Cinner et al., 2012). Third, *equity and efficiency* of decisions is enhanced. Fourth, local capacity building helps efforts to be more *long-term* (Plummer and Armitage, 2007). Fifth, clear ownership and property rights encourage *participation* and productive involvement in decision-making (Gutiérrez et al., 2011). It is another question whether these advantages can be transferred into practice.

In forestry, numerous studies have demonstrated that certain factors, e.g. monitoring are important for successful management without explicitly addressing differences in regimes (e.g. Pagdee et al., 2006; Coleman and Steed, 2009; Gibson et al., 2005; van Laerhoven, 2010).

In fisheries, some studies have shown that co-managed regimes are associated with more positive outcomes than state regimes. For example, one study reports more beneficial outcomes in co-managed regimes for livelihoods, fish biomass and compliance with rules (Cinner et al., 2012). While not concerned with a direct comparison, another study finds robust relationships between co-management attributes and success measures like social welfare, sustainable catches and community empowerment (Gutiérrez et al., 2011).

In irrigation contexts, the benefits of community-based management and co-management over state-only governed systems are well understood by both scholars and practitioners (Garces-Restrepo et al., 2007). A well-known case of successful community-based management is that of Nepalese irrigation systems, where farmer-managed systems outperform agency-based systems in terms of productivity, water delivery and condition of system infrastructure (Lam, 1998 Tang, 1992). State interventions had only positive short term effects (Joshi, 2000; Lam and Ostrom, 2010).

In sum, three conclusions should be noted. First, evidence regarding the effectiveness of co-management and interventions is not conclusive, although in general co-management practices are rated as more positive than negative. Second, different operationalizations of what constitutes co-management or community-based management may be part of this inconclusive evidence. Third, there are very few studies comparing state-governed, co-managed and community-managed systems

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