



A systematic review of co-managed small-scale fisheries: Social diversity and adaptive management improve outcomes

Laia d'Armengol^{a,*}, María Prieto Castillo^a, Isabel Ruiz-Mallén^{a,b}, Esteve Corbera^a

^a *Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, ICTA-ICP, Edifici Z, Carrer de les Columnes, Campus de la UAB, 08193 Bellaterra (Cerdanyola del Vallès), Barcelona, Spain*

^b *Internet Interdisciplinary Institute (IN3), Universitat Oberta de Catalunya, Edifici B3, Parc Mediterrani de la Tecnologia, Av. Carl Friederich Gauss 5, 08860 Castelldefels, Barcelona, Spain*

ARTICLE INFO

Keywords:

Adaptive co-management
Collaborative management
Small-Scale fisheries
Ecological outcomes
Social benefits

ABSTRACT

Small-scale fisheries are an important source of livelihoods, particularly among poor coastal populations. To improve fisheries' condition and maximize their contribution to human welfare, co-management approaches have proliferated worldwide. In this article, we conduct a systematic review of academic literature to examine the context and attributes of co-management initiatives in small-scale fisheries, and their expected outcomes. The review suggests that a supporting legal and institutional framework facilitates the emergence of co-management, because it contributes to clarify and legitimize property rights over fish resources. It is also found that co-management delivers both ecological and social benefits: it increases the abundance and habitat of species, fish catches, actors' participation, and the fishery's adaptive capacity, as well as it induces processes of social learning. Furthermore, co-management is more effective if artisanal fishers and diverse stakeholders become involved through an adaptive institutional framework. However, the review also suggests that more research is needed to discern when co-management initiatives can transform pre-existing conflicts, challenge power asymmetries and distribute benefits more equitably.

1. Introduction

Small-scale fisheries support the livelihoods of many coastal communities around the world (Kittinger et al., 2013). Ninety percent of the world's fishers are directly involved in small-scale fishing, i.e. about 34 million people, and another 100 million are involved in related activities (Béné et al., 2007; FAO, 2016a, 2016b). However, these fisheries face growing threats such as overfishing, competition with industrial fleets, water pollution, destruction of fish habitats, and an increasing human population and demand for land in coastal areas (FAO, 2016b). Increasing fishing pressure is leading to a reduction of marine biodiversity, which will over time make fisheries less resilient in a changing global climate (Brander, 2007). These threats are coupled with a limited capacity of many governments to develop and support management models that suit the multispecies character of small-scale fisheries and the numerous and dispersed landing sites characterizing them (Allison, 2001; Kolding et al., 2014).

The co-management of small-scale fisheries has emerged as a response to these threats and challenges, proliferating worldwide over the

last decade (FAO, 2016b). Co-management promotes the joint management of the fisheries' resources by direct users, governments and other actors (Armitage et al., 2007a; Berkes, 2009). It is regarded as a participatory management model able to foster the sustainability of fisheries in biological, social, and economic terms (Costanza et al., 1998; Gutiérrez et al., 2011; Jentoft, 1989; Muñoz-Erickson et al., 2010; Pinkerton, 1989). Co-management can contribute to meet both fisheries and conservation objectives in marine ecosystems (Worm et al., 2009). It has also been shown that co-management can deliver greater benefits to local communities in both terrestrial and marine protected areas because, by strengthening tenure rights and decision-making processes, it can result in increased and more equitably shared economic benefits (Oldekop et al., 2016).

A previous review of industrial and artisanal fisheries (Gutiérrez et al., 2011) identifies a number of co-management attributes that are conducive to positive outcomes, including the presence of community leaders, strong social cohesion, individual or community fish quotas, and community-based protected areas. A meta-analysis focused on small-scale fisheries (Evans et al., 2011) demonstrates that co-

* Corresponding author.

E-mail addresses: laia.darmengol@uab.cat (L. d'Armengol), maria.prietocastillo@gmail.com (M. Prieto Castillo), iruiz_mallen@uoc.edu (I. Ruiz-Mallén), esteve.corbera@uab.cat (E. Corbera).

<https://doi.org/10.1016/j.gloenvcha.2018.07.009>

Received 24 January 2018; Received in revised form 25 May 2018; Accepted 13 July 2018

0959-3780/© 2018 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Basic information						
World region	Country	Country region	Community/ies	Cooperative/s	Fishery	Main species
Context						
Resource system	Resource unit	Governance system				
Fishery type ^b	Resource type ^b	Co-management in law ^b	Restocking ^b		Occupational diversity ^a	
Clarity of system boundaries	Diversity ^d	Decentralization ^d	Subsidies ^d		Leadership	
Area ^a	Mobility outside the fishery ^c	Kind of decentralization ^d	Subsidies linked to co-management ^d		Social cohesion ^a	
Productivity	Species group ^d	Previous institutions ^c	Sanctions ^a		Conflict among users ^d	
Predictability of system dynamics	Overharvesting ^c	Previous property rights ^c	Graduated sanctions ^a		Motivation for conflict ^d	
Storage capacity ^c	Fishing at other scales ^d	Post property rights ^a		Users	Shared understanding of the social-ecological system ^a	
Fishing cooperatives ^d	Economic value	Operational rules		Group size ^d	Long history of resource use ^c	
	Price ^c	Monitoring		Number of user groups ^d	Fishing types ^c	
	Market ^c	Long-term management policy ^b		Number of users	Indigenous users ^d	
	Spatial heterogeneity ^c	Protected areas ^b		Primary livelihood ^d	Majority of indigenous ^d	
					Illegal fishing ^d	
Co-management attributes						
Co-management features	Interactions and decision making	Participation		Networks		Adaptive management^b
Goals ^d	Regime ^d	Participants' typology ^d		Cross-scale interactions ^c		Adaptive co-management ^d
Changing goals ^d	Power sharing ^b	Socio-economic diversity ^d		Knowledge sharing ^c		Systems orientation ^d
Years of co-management ^b	Previous collaboration ^d	Gender diversity ^d		Bridging organization ^c		Interaction ^d
Stage of co-management ^b	Willingness for co-management ^d	Age diversity ^d		Bonding organization ^c		Integration ^d
Success or failure ^d	Conflict-resolution mechanisms ^d	Ethnic diversity ^d				Innovation ^d
	Facilitative leadership ^d	Knowledge systems diversity ^d				Experimentation ^d
		Diversity of interests ^d				Reflection ^d
						Flexibility ^d
Outcomes						
Ecological outcomes	Process outcomes	Legitimacy^d	Individual learning	Socio-economic outcomes		Transaction costs^d
Species	Participation	Conflicts ^d	Skills and knowledge ^d	Catches		Infrastructure
Size ^d	Participation in management ^d	Actors in conflict	Information ^d	Fishery catches ^d		Individual fishing equipment ^d
Abundance ^d	Participation in problem solving ^d	Kind of conflict	Individual knowledge on dynamics ^d	Collective catches ^d		Collective fishing equipment ^d
Diversity ^d	Participation in decision making ^d	Networks	Individual knowledge on rules ^d	Individual catches ^d		Other fishing infrastructure ^d
Functions	Participation in monitoring ^d	Existence of networks ^d	Social learning	Income		Other infrastructure ^d
Habitat ^d	Users involved ^d	Extended networks ^d	Collective knowledge on dynamics ^d	Fishery income ^d		
Key ecological processes ^d	Women involved ^d	Local fit	Collective knowledge on rules ^d	Collective income ^d		Generic outcomes
Pollution ^d	Cooperation^d	Local knowledge ^d	Shared values ^d	Individual income ^d		Wellbeing^d
	Compliance^d	Local norms ^d	Shared understanding ^d	Equity		Vulnerability^d
		Local conditions ^d	Social norms ^d	Resources distribution ^a		Adaptive capacity^d
		Power asymmetries^d	Local conditions ^d	Income distribution ^c		
			Policies ^d			
			Governing norms ^d			

Fig. 1. A framework for the analysis of co-management in small-scale fisheries.

Each of the four variable domains includes variables and may also include categories (in bold). In the *outcomes* domain, underlined words with variables underneath refer to variable groupings. Variables without superscript specify variables from Ostrom's framework (Ostrom, 2009, 2007), superscript ^a specifies variables adapted from Ostrom's framework by other authors, superscript ^b specifies variables included in other works (Basurto et al., 2013; Ernst et al., 2013; Gutiérrez et al., 2011; MacNeil and Cinner, 2013), superscript ^c specifies variables adapted from Ostrom's framework, and superscript ^d specifies our own proposed variables.

management results in positive impacts on fishers' income and other sources of material wellbeing, as well as on the fishery's ecological condition. The study also shows that co-management improves social participation, compliance with the fishery's management rules, and local control over resources while reducing conflict. These findings echo others who previously argued that co-managed fisheries enhanced social equality (Loucks et al., 2003), resulted in more legitimate norms that better fit local conditions (Jentoft, 1989), fostered responsibility among resource users (Nielsen and Vedsmand, 1999), and reduced management costs (Carlsson and Berkes, 2005).

Further, in a context of climatic changes related to sea level rise, ocean temperature change and ocean acidification, which might modify coastal ecosystems and fish species' range and behaviours (Savo et al., 2017; Wong et al., 2014), the adoption of adaptive management principles can be critical for the sustainability of small-scale fisheries in the near future. Flexible, innovative and experimental management practices could in this context strengthen co-management initiatives and improve the capacity of the social-ecological system to better cope with uncertainty and surprise (Armitage et al., 2007b; Olsson et al., 2004).

Our systematic review builds on and contributes to co-management literature by examining the links between context, attributes and outcomes of co-managed small-scale fisheries through the lens of Ostrom's framework for the analysis of social-ecological systems (McGinnis and Ostrom, 2014; Ostrom, 2009, 2007), which we complement with other indicators from adaptation and co-management literature (Basurto et al., 2013; Cinner et al., 2012; Ernst et al., 2013; Gutiérrez et al., 2011; Partelow, 2015; Plummer et al., 2014, 2012; Plummer and Armitage, 2007a; Plummer and FitzGibbon, 2007). To our knowledge, this is the first review of co-managed small-scale fisheries that includes adaptive management attributes to test how such attributes affect

outcomes. Specifically, we ask: Which are the context and attributes of co-managed small-scale fisheries? Which outcomes does the co-management of small-scale fisheries result in? And, how are the context and attributes influencing co-management outcomes? By answering these questions, we contribute to a better understanding of how co-managed small-scale fisheries work as complex social-ecological systems while suggesting ways to improve their performance.

In what follows we introduce the analytical framework, explain the systematic review's protocol, and present our results organized according to our three questions. We first characterise the context and attributes of co-management, and we find that co-management usually develops in contexts of natural resource management decentralization, where co-management contributes to move away from an open access condition and it supports the creation of a new property regime and more legitimate management rules. Second, we show that co-management results in positive social and ecological outcomes overall, while its ability to resolve pre-existing conflicts, address power asymmetries or distribute benefits more equitably is less certain because these issues are scarcely reported in the literature reviewed. Finally, when looking at which context and attribute variables might be influencing co-management effects, we find that involving a diversity of actors and implementing adaptive management practices contribute to more positive outcomes. We discuss these and other findings in the light of relevant literature and we conclude by emphasizing the potential of co-management to foster the sustainability of small-scale fisheries and by highlighting research gaps.

Download English Version:

<https://daneshyari.com/en/article/7468723>

Download Persian Version:

<https://daneshyari.com/article/7468723>

[Daneshyari.com](https://daneshyari.com)