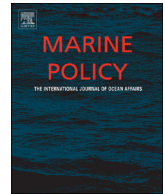




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Does co-management facilitate adaptive capacity in times of environmental change? Insights from fisheries in Australia

Melissa Nursey-Bray^{a,*}, Pedro Fidelman^b, Mensah Owusu^a

^a Department of Geography, Environment and Population, University of Adelaide, North Terrace, Adelaide, SA 5005, Australia

^b Centre for Policy Futures, The University of Queensland, St Lucia, QLD 4072, Australia

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ABSTRACT

This article assesses how federal and state government approaches to fisheries co-management in Australia facilitate adaptive capacity to environmental change. Drawing on the Adaptive Capacity Wheel, co-management approaches were assessed in terms of their capacity to: (1) encourage the involvement of a variety of actors, perspectives, and solutions; (2) enable actors to continuously learn and improve governance institutions; (3) allow and motivate stakeholders to self-organise, design and reform their institutions; (4) mobilise leadership qualities of social actors; (5) mobilise resources for decision-making and implementation; and (6) support principles of fair governance. Results show that federal government approaches have been limited in facilitating adaptive capacity. Conversely, co-management approaches in South Australia have gone part way to facilitate such capacity. Ultimately, this study underscores how broad characteristics of fisheries management arrangements facilitate adaptive capacity to improve success of fisheries co-management in responding to environmental change.

1. Introduction

The impacts of climate change on fisheries include modification in species composition, abundance and distribution. They influence supply, access and use of fisheries resources, ultimately, affecting dependent communities and industries [1]. The inherent ability of fisheries to adapt to such impacts is differentially distributed; unevenness is determined by variability in access to resources, and existence of networks, technology, and effective governance regimes [1]. Creating conditions that build adaptive capacity will limit fisheries vulnerability to the diverse suite of these impacts the sector is likely to face. This will require multiple approaches, including those that are tailored to specific situations and geographical scales, and acknowledge fisheries as social-ecological systems [2]. One promising approach is co-management, which is believed to serve as an adequate platform for supporting fisheries adaptation to climate change [2]. However, we suggest that considerable implementation challenges may limit co-management ability to support adaptation. Drawing on the Australian experience with fisheries co-management at federal and state levels, this study explores whether/how co-management may facilitate adaptive capacity to climate change.

Australian fisheries management is considered to be at the forefront of current marine fisheries management, and in particular has been trialling co-management approaches across multiple fisheries. South Australia was the first Australian state to establish enabling legislation for fisheries co-management. The Australian context, therefore, provides a unique opportunity for examining the role of co-management as an enabler of climate change adaptation in fisheries.

Drawing on the Adaptive Capacity Wheel, developed by Gupta et al. [3], this study assessed the role of Australian co-management approaches in enabling adaptive capacity. It shows that while federal approaches have had a limited enabling effect, co-management approaches in South Australia have gone part way to enable such capacity. Ultimately, the paper posits that understanding key management characteristics that enable adaptive capacity is paramount to improve the success of fisheries co-management under a changing climate.

2. Co-management and fisheries

Co-management, referred to as “the sharing of power and responsibility between the government and local resource users” ([4] 12), has a long history within common pool resources, such as fisheries.

* Corresponding author.

E-mail addresses: Melissa.Nursey-Bray@adelaide.edu.au (M. Nursey-Bray), pedro@fidelman.me (P. Fidelman), Mensah.Owusu@adelaide.edu.au (M. Owusu).

Although power sharing is important, it is not necessarily the means to the end, but the result of an ongoing *process* [5]. Co-management can be understood as “...a situation in which two or more social actors negotiate, define and guarantee amongst themselves a fair sharing of the management functions, entitlements and responsibilities for a given territory or a set of natural resources ([6] 1).

The centrality of building partnerships is inherent in most co-management approaches, but has different emphases on what kinds of partnerships occur. Partnerships between the state and different community actors¹ are one approach, but partnerships between multiple public and private parties (not always government) can also happen. Carlsson and Berkes ([5] 68) identify five forms of co-management: (i) as an exchange system, (ii) as joint organisations, (iii) as community nested systems, (iv) as state-nested systems and, finally, (v) as networks. Nursey-Bray and Rist [7] also stress the importance of building horizontal as well as vertical spectrums for power sharing and equitable allocation of responsibility and decision making in relation to Indigenous co-management regimes.

Power sharing across scales and levels of fisheries governance is also crucial since it affects the participation (or not) of stakeholders. For example, in North Carolina, commercial fishers choose not to participate in formal co-management preferring instead informal governance arrangements. This has, however, led to environmental degradation and inequities in governance [8]. An important facet here is the ongoing contest between recreational and commercial fishers – the enactment of co-management often does not recognise the differentiations between these sectors. For example, in the Two Rivers example in North Carolina, recreational fishers take 71% of the total harvest of spotted seatrout, yet regulations focus on commercial activity [8]; this speaks to the need to explore the different actors and vested stakes each sector has in the resource being managed. In any case, as Carlsson and Berkes [5] argue, the essential consideration of the multiple complexities in co-management – the state, communities, and the dynamic and complex socio-ecological systems – provide obstacles that make its implementation more challenging.

Co-management is also constructed as a continuum, where conditions and management evolves [9]. Despite the diversity of these definitions, they all hold partnerships, and some form of power sharing or collaboration between parties as key elements. Forms of collective action may be mobilised to expedite this power sharing – a process that was key to the formation of a local marketing cooperative for the co-management of coastal marine fisheries, for example, in the Gulf of Nicoya, Costa Rica [10].

The resources within the marine domain can be very mobile, and ownership of the resources less clear (and often held in common). Analyses of marine co-management highlight some of these complexities. The effective implementation of co-management also relies heavily on the ways in which stakeholders are identified, what kinds of influence they have and to what degree they participate in or are affected by the political economy of the time [11]. Effective co-management will need substantive stakeholder participation, empowerment and knowledge sharing [12].

Co-management in a marine context has added complexity. In particular, the levels of participation will depend on what stake each stakeholder group has in the process. As Reed et al. ([11] 1937) note, “a key problem lies in deciding whether the phenomenon under investigation should dictate what stakeholders are involved, or whether it should be the other way around”. This is important in informing this study since different stakeholders, depending on their stake, may exhibit higher or lower degrees of adaptive capacity. Further, fisheries management has been characterised by a focus on its user groups – as in the fishers, yet, there has been a transition to

considering the public interest and impact of fisheries by other stakeholders [13]. In this case, stakeholders include managers, local government, retail, non-government groups, coastal residents and many more.

A case study of co-management in three east African countries shows the pragmatic difficulties involved in sharing power. In these countries, decentralised management efforts were only partly successful in transferring power to locals and were largely donor driven; underscoring the domination of major actors in co-management processes [14]. A comparative analysis of co-management in the Caribbean by Pomeroy et al. [15] provides insights into effective conditions for successful co-management. Their analysis finds that changes in the attitude and behaviour of government regarding the sharing of power, and ongoing consultation and dialogue, ensure the inclusion of all stakeholders (that is those with an interest in the management), their diversity, and their multiple uses and needs [15]. Moreover, addressing imbalances in power, and strengthening community groups and their institutional capacity, whilst providing participatory incentives and clarity regarding property rights, enables greater co-management success [15].

Ensuring equity in benefit sharing emerges as a pivotal factor affecting the implementation of co-management [16]. In fisheries management, co-management is two-fold. It either can add to other existing regimes, or can be, in itself, *the* form of governance. As Pinkerton [17] notes, co-management in fisheries contexts has great potential; it allows for the collection of data, provides clarity around enforcement, compliance, rules and regulations, and can embed conflict resolution mechanisms and decision-making systems across all parties. In a critical review of 157 examples of fisheries co-management, Wamukota et al. [18] argue that a large theoretical and empirical gap exists in how fisheries co-management works, and that most did not fully meet key criteria for co-management.

Building adaptive capacity either as part of the co-management, or within an adaptive management approach is emerging as a key method for management [19]. In this study, adaptive capacity refers to:

...the preconditions necessary to enable adaptation and the ability to mobilise these elements. It is represented by the set of available resources and the ability of the system to respond to disturbances and includes the capacity to design and implement effective adaptation strategies to cope with current or future events ([20] 758–9).

As highlighted in a case of co-management and adaptive co-management in a Honduran marine protected area, fulfilling all the objectives of either approach in practice is difficult, and only partly achieved [21]. Plummer et al. [22], however, demonstrate that adaptive co-management delivers results when accompanied by serious collaborations and learning processes. In this regard, trust is also a key element as shown in an example of New Zealand's rock lobster fishery, where it has acted to balance and promote participation by relevant institutions and stakeholders in the management of this resource [23].

Climate change is a compounding factor affecting the suitability of co-management, and other management approaches, to build adaptive capacity and ensure continuity in existing fisheries. For example, in a case study of the soft shell clam fishery and invasive green crabs in Maine, McClenachan et al. ([24] 25) found that co-managed fisheries built adaptive capacity by creating more stability, greater and more consistent productivity and overall greater institutional flexibility to respond to change, resulting in better adaptation capability than conventionally managed fisheries. Adaptive management not only promote fisheries resilience but also ecological resilience because learning and science are included in management [25]. Similarly, in Australia, Ogier et al. ([2] 82) find that ecosystem-based approaches when combined with adaptive management and co-management address the “full array of adaptation capacities and attributes required for adaptation in fisheries”.

¹ By actors we mean those individuals or agencies that have a performative role to play in either enacting or gaining benefit from co-management/policy.

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