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Sustainable financing of a national Marine Protected Area network in Fiji

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ABSTRACT

Marine Protected Areas (MPA) are mostly studied from an environmental context. A review of available information identified a lack of knowledge in sustainable mechanisms to finance MPA networks. At the United Nations Ocean Conference in 2017, Fiji reaffirmed its voluntary commitment to make 30% of its inshore and offshore marine area MPAs by 2020 under Sustainable Development Goal 14. The work presented here uses empirical data to explore potential benefits from selected community-based MPAs to recipient local stakeholders. A Willingness to Pay (WTP) and Willingness to Contribute Time (WtCT) method was used to explore the extent to which bottom-up governance systems represent a potential financing mechanism of a MPA network. Results of 115 interviews concluded that proximity to a fishing market, dependence on marine resources, food security, income and international commitments were significant variables influencing stakeholder's WTP and WtCT to manage a MPA. We argue that there is a discrepancy between WtCT and WTP driven by income constraints. Thus, by using WTP and WtCT to support financing of a MPA network, a Provincial Trust Fund (PTF) could promote an equitable and benefits-based contribution. Equally important, a PTF has a polycentric and decentralized governance model, which endorses sustainable management of traditional fishing communities. The conclusions provide insight into a bottom-up approach for long-term financial sustainability of Fiji's national MPA commitments.

1. Introduction

By 2060, global projections estimate more than one billion humans worldwide will live in coastal zones (Tilman et al., 2017). The populations at greatest risk to sea-level rise and unsustainable use of marine resources includes Small Island Developing States (SIDS). SIDSs marine environment are susceptible to anthropogenic pressures like overfishing and climate change (Eastwood et al., 2016). To combat these pressures, the government of Fiji has committed to using MPA's as a tool to reduce poverty, improve food security and protect biodiversity (Yap et al., 2016).

MPAs can be defined as: 'explicit areas of ocean where human activities are regulated or prohibited' (Eastwood et al., 2016). Government–managed MPAs can rebuild small fish stocks but have been severely criticized for disregarding resource users and creating conflicts (Chirico et al., 2017). In Fiji, inshore MPAs have been framed to maximize fisheries benefits while spreading costs as equitably as possible amongst communities (Weeks and Jupiter, 2013). However, MPAs as a term has limited saliency in Fiji and "Marine Managed Area (MMA)" is preferred by many stakeholders (Diedrich et al., 2017). This is because indigenous peoples of the South Pacific have a deep connection with the sea which encompasses reliance on ocean resources for food and livelihoods. These inhabitants have deep-rooted customary laws related to the ocean which includes safeguarding inshore marine areas (*iqoliqoli*) (Friedlander et al., 2016). The most frequently implemented management tool within MMAs is periodically harvested closures, which are fisheries closures with opening regimes ranging in restrictions (Cohen and Foale, 2013).

The unique nature of marine resources in the *iqoliqoli* contributed to the formation of Fiji Locally Managed Marine Areas (FLMMA) (FLMMA, 2015). FLMMA is a network of government, non-government and community partners linking villages with formal and informal marine management efforts (Govan et al., 2009; Aalbersberg et al., 2005). Accordingly, success of FLMMAs pays close attention to resource users being involved in MPA design, implementation and enforcement (Chirico et al., 2017).

In line with MMAs, Fiji's National Green Growth Framework and the National Biodiversity Strategies and Action Plan (NBSAP) (Ministry of Environment, 2007) provides key linkages between national policy objectives and strategies to support an MPA network (Yap et al., 2016).

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This includes permanence with long-term protection in mind and, resilience of the marine environment. The NBSAP framework and action plan are legal commitments reaffirmed at the SIDS conference in 2014 to protect 30% of Fiji's seas by 2020 (Yap et al., 2016). As of December 2013, 16.6% of coastal waters were effectively protected through community-based management schemes.

The marine ecosystem and fisheries play a central economic and social role in Fiji (Gillett, 2016) worth more than FJD2.6 bill (USD $13.04 bill) per year (Yap et al., 2016). In many areas of the world the most acute problem facing developing states is poverty, which sequentially has been the primary cause of environmental degradation. But the Fijian population have not traditionally suffered from stark poverty, which has been circumvented due to the prevalence of subsistence livelihoods (Gerbeaux et al., 2007). Marine resources collected from traditional fishing grounds (*iqoliqoli*) have historically been the main source of protein for native people, with any excess harvest being sold. This is expected to remain the case in the future (Techera and Troniak, 2009).

That being said, Fiji has been assisted by the Marine and Coastal Biodiversity Management in Pacific Island Countries (MACBIO) Project implemented by German Agency for International Cooperation (GIZ) and the International Union of Conservation and Nature (IUCN) as the main technical input. They aim to strengthen the sustainable management of marine and coastal biodiversity (Berthold, 2016). A critical gap identified by the MACBIO project is potential sustainable financing mechanisms used to maintain a MPA network. Worldwide, implementing sustainable financing mechanisms for MPA management is a challenge, especially in SIDSs' like Fiji (Weeks and Adams, 2018). Common sources of funding for MPAs can be local and/or international and include government budget support (Bos et al., 2015), non-government organizations (Binet et al., 2015), user fees (Vianna et al., 2011), ecotourism (Fronseca, 2009) and donations (Reid-Grant and Bhat, 2009).

Diversifying sources of financing is critical for financial sustainability and protection of marine resources. This will protect Fiji's government against over-reliance on a single source of funding, and on donor support. Non-monetary techniques advance prominence to the subsidies provided by nature to society: i.e. cultural, educational, moral, historical or spiritual values of ecosystem services (Portman et al., 2016). This study was driven by the need to develop social but not inevitably monetary techniques for investigating the fundamental incentives behind biodiversity conservation and MPA financing mechanisms.

In order to achieve financial sustainability of a national MPA network, it is critical to take into consideration the need to increase the capacity to self-generate additional revenue at the national level. On the other hand, it is equally important to improve the institutional capacity to adequately manage financial resources and enable reliable long-term funding. Thus, the use of socio-economic criteria is especially important in the context of SIDSs where social acceptance is a critical factor in determining MPA success (Ban et al., 2009). When considering a holistic approach to funding MPAs, the use of innovative financing mechanisms like Willingness to Contribute Time (WtCT) rather than money to manage a MPA should be considered. WtCT characterizes the connection between ecological processes and coastal societies (O'Garra, 2009) through socio-cultural links to community. Previous studies have examined how to finance MPAs by using foreign assistance (Gurney et al., 2015) which has proven to be more financially resourceful than national budget (Gurney et al., 2015). However, to date, there is no study in Fiji on sustainable financing of MPAs.

By using a Contingency Valuation (CV) this study will assess how use and non-use ecosystem services can contribute to financing of a national MPA network. The CV approach attempts to estimate the value of ecosystem services to community stakeholders (McFadden and Train, 2017). It is a unique way to assign dollar values to non-use values of the environment-values that may not involve direct participation. Current literature proclaims that the CV approach lacks the empirical evidence to develop economic values due to a theoretical line of questioning (Christie et al., 2012). However, despite this criticism, CVs are the foundation for policymaking countries (e.g. USA) and can support current communal payment systems in place (Merkl et al., 2003). That being said, overall, little attention has been given to a more in-depth assessment of the CV approach in Fiji and the value it may have in financing a MPA network. Given locals' irreplaceable rights situation, it is important to elucidate unique financing mechanisms for MPAs.

Community-level resource governance must be considered in financing a MPA network (Francisco, 2016). Tanya O'Garra (2009) conducted a CV study in Fiji estimating the non-use values of a traditional fishing ground to local communities 10 years ago. O'Garra's (2009) methodology was used for this study because of the repeatability of study sites and lack of attention to cultural ownership of inshore MPAs amongst coastal communities. This reflects the traditional view that subsistence groups are 'too poor to be green' and thus alterative-funding methods for the marine environment must be considered. This study aims to assess stakeholders Willingness to Pay (WTP) and/or Willingness to Contribute Time (WtCT) to manage the *iqoliqoli* as a potential financing mechanism for inshore MPAs. These results will provide recommended financing mechanism which could contribute to management costs of Fiji's MPA commitments.

2. Methods

A case-study approach was adopted for collection of empirical data. This provided a description of socio-economic characteristics, MPA benefits, and WTP and/or WtCT for MPA management. Seeing that the focus of the survey is on low-income developing communities in Fiji, we limit our discussion of financing options to those that are available and realistic in SIDSs. Key informants are important for this study because of the knowledge regarding national commitments and priorities that local stakeholders are disconnected from. Key informant interviews distinguished five beneficiary groups; (Youth, Head of Village, Household (Women), Subsistence Fishermen, Commercial Fishermen) (n = 115) (Table 1). The five beneficiary groups are critical for this study because of their consumptive and cultural reliance on the inshore marine environment. Considering the 2020 national commitments and this study focusing on financing of an inshore MPA network, beneficiaries and key informant will be used in combination for analysis. Key informants were used to gain an overview of relevant benefits and local stakeholders WTP/WtCT to manage MPAs. Selecting interviewees

Table 1
Explanatory design of 115 interviews on 3 islands in 4 or 5 communities per island (site). Five stakeholder groups (n = 115) were interviewed in communities showing a broad range of data.

Stakeholder groups	Sites			Total
	Navakavu community (n = 36)	Gau Island (n = 46)	Macuata *qoliqoli* Cokovata (n = 33)	
Youth	9	20	9	38
Heads of Village	6	6	8	20
Household (Women)	9	12	10	31
Subsistence Fishermen	6	5	1	12
Commercial Fishermen	6	3	5	14
				115

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