



Participation in devolved commons management: Multiscale socioeconomic factors related to individuals' participation in community-based management of marine protected areas in Indonesia



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ABSTRACT

Management of common-pool natural resources is commonly implemented under institutional models promoting devolved decision-making, such as co-management and community-based management. Although participation of local people is critical to the success of devolved commons management, few studies have empirically investigated how individuals' participation is related to socioeconomic factors that operate at multiple scales. Here, we evaluated how individual- and community-scale factors were related to levels of individual participation in management of community-based marine protected areas in Indonesia. In addressing this aim, we drew on multiple bodies of literature on human behaviour from economics and social science, including the social-ecological systems framework from the literature on common-pool resources, the theory of planned behaviour from social psychology, and public goods games from behavioural economics. We found three key factors related to level of participation of local people: subjective norms, structural elements of social capital, and nested institutions. There was also suggestive evidence that participation was related to people's cooperative behavioural disposition, which we elicited using a public goods game. These results point to the importance of considering socioeconomic factors that operate at multiple scales when examining individual behaviour. Further, our study highlights the need to consider multiscale mechanisms other than those designed to appeal to self-interested concerns, such as regulations and material incentives, which are typically employed in devolved commons management to encourage participation. Increased understanding of the factors related to participation could facilitate better targeting of investments aimed at encouraging cooperative management.

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1. Introduction

During the 1990s, decentralisation reforms in many developing countries led to management of common-pool natural resources being widely implemented under institutional models promoting devolved decision-making and participation of local people, such as co-management and community-based management (Berkes, 2010). These decentralisation reforms were responses to the poor performance of centralised management and involved transfer of decision-making and financial responsibilities from a central authority to lower scales of government (Brugere, 2006). Due to

increasing recognition of local people's rights and ability to manage their local environment, decentralisation has often been accompanied by devolution, the transfer of management rights and responsibilities to local non-governmental institutions, typically user groups, which have discretionary decision-making power (Berkes, 2010). Devolved management of common-pool resources (hereafter "devolved commons management") is now part of the discourse and practice of many organisations, both government (e.g. Chilean; Gelcich et al., 2010) and non-government (e.g. the World Bank; Mansuri and Rao, 2004). However, the success of devolved commons management in achieving positive biological and socioeconomic impacts is highly variable (Brooks et al., 2012; Cinner et al., 2012).

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Devolved commons management is underpinned by participation of local people, with the extent of participation shown repeatedly to be critical to achieving positive impacts (Pagdee et al., 2006; Brooks et al., 2012). For example, a study of devolved forest management in six countries found that local participation was related to improved biological and livelihood outcomes (Persha et al., 2011). Participation of local people, especially those who will be affected by management, is often viewed as an important mechanism to provide incentives to people to use their resources sustainably, because it improves perceived legitimacy of rules, and ensures that management is likely to better reflect the needs and preferences of local people (Larson and Soto, 2008; Persha et al., 2011). Indeed, participation has been shown to improve knowledge and attitude towards community-based management of marine and terrestrial resources (Brooks et al., 2012). In addition, incorporating local knowledge of the social-ecological system through participation is thought to increase the effectiveness of management (Ostrom et al., 1993).

However, our understanding of the factors influencing local people's individual decisions relating to participation in devolved commons management is limited (Zanetell and Knuth, 2004; Larson and Soto 2008; Tesfaye et al., 2012). Much of the existing empirical literature on decentralised and devolved approaches to commons management focuses on identifying impacts (e.g. Maliao et al., 2009; Gurney et al., 2014, 2015), or the socioeconomic and institutional conditions related to them (e.g. Agrawal and Chhatre, 2006; Cinner et al., 2012). Studies that have focused on participation in devolved commons management tend not to examine individuals' participation behaviour, but rather use local government administrations (e.g. Larson, 2002; Andersson, 2006) or local communities (e.g. McKean 1992; Varughese and Ostrom 2001) as the unit of analysis (Andersson and Ostrom, 2008; Chaigneau and Daw, 2015). However, given that communities are heterogeneous social structures (Agrawal and Gibson 1999; Gurney et al., 2015), understanding participation of local people in devolved commons management also requires complementary analyses that use individuals as the unit of analysis. Indeed, there is a considerable body of related literature that examines individual private landholders' decisions to adopt conservation practices (e.g. Marshall 2009; Pannell et al., 2006). However, management of private property tends to generate largely private benefits, as opposed to management of common property, which is less excludable and generates mostly public benefits.

Using individuals as the unit of analysis allows examination of factors that operate at multiple scales (e.g. individual and community scale) to influence behaviour. Although, individuals have different interests and characteristics that influence whether they will perform a particular behaviour (Botchway, 2001), individuals' behaviour is also shaped by the characteristics of the larger-scale context in which they are embedded (Altman et al., 1984; Ostrom 2007). Contextual factors (e.g. characteristics of the government system) are also important in devolved commons management because they represent potential levers for management. Thus, understanding what motivates individuals' decisions requires consideration of multiscale factors that reflect the nested hierarchical structure of the social-ecological system in which human behaviour is situated.

Empirical studies of environmental management behaviour that use individuals as the unit of analysis, including the few studies on participation of local people in devolved commons management, tend to focus solely on the influence of individual-scale factors on behaviour (Dolisca et al., 2009; Qin and Flint, 2010). Individual-scale factors found to be important in these studies include wealth (e.g. Agrawal and Gupta, 2005), gender (e.g. Baral and Heinen, 2007), education (e.g. Chen et al., 2013) and resource dependence (e.g. Dalton et al., 2012). While the importance of

context is often recognised and described qualitatively in these studies, inclusion of multiscale characteristics in quantitative analyses is rare. Considering all potentially influencing factors in one analysis offers the advantage of providing insights into the relative magnitude and importance of those factors (Goldthorpe, 1997; Agrawal and Chhatre, 2006).

Given the prevalence of devolved commons management and the importance of participation of local people for success, understanding the factors influencing participation is of crucial scientific and policy importance. To this end, we examine the factors related to the level of individual participation of local people in management of marine protected areas (MPAs), a primary tool employed in devolved management of marine common-pool resources. Of the few studies that have quantitatively assessed how individuals' participation is related to socioeconomic factors, to our knowledge this study is the first to do so at multiple scales in a marine context. Using data from 13 MPAs in Indonesia we ask "How are community- and individual-scale factors related to the level of individual participation of local people in community-based MPA management?"

1.1. Conceptual approach

We take an interdisciplinary approach to investigating the factors related to local participation in devolved commons management by drawing on multiple bodies of empirical and theoretical literature on human behaviour. Specifically we employ the social-ecological systems framework (Ostrom, 2007) from the literature on common-pool resources, the theory of planned behaviour (Ajzen, 1991) from social psychology, and public goods games (e.g. Aswani et al., 2013) from behavioural economics.

The social-ecological systems framework focuses on how commons-related behaviour and social-ecological outcomes are shaped (Ostrom, 2007). This multitier framework depicts elements of the social-ecological system operating at multiple scales that are thought to influence outcomes in situations involving common-pool resources (Ostrom, 2007). Four core subsystems are described: the resource system (e.g. forest); resource units (e.g. trees); actors (e.g. resource users); and the governance system. The 'action situation', around which the framework is orientated, details actors' interactions or behaviour, and social-ecological outcomes. Each of the subsystems is composed of second-tier variables that may be drawn upon to assess specific social-ecological outcomes and behaviours, such as participation in management. Given the framework emphasises the hierarchical structures of the social-ecological system in which behaviour is situated, we employ it to structure our analysis and draw on the second-tier variables to guide our choice of socioeconomic factors to examine. Many of the second-tier variables describing the actor subsystem are at the community scale (e.g. number of actors). Indeed, the second-tier variables are particularly salient to studying the conditions that facilitate communities (rather than individuals) to sustainably harvest and manage common-pool resources (Basurto et al., 2013), and are based on the existing literature on common-pool resources that tends to use communities as the unit of analysis (Chaigneau and Daw, 2015). There are a small number of studies that have empirically examined individuals' participation in devolved commons management (e.g. Agrawal and Gupta, 2005), but these have focused on terrestrial resources. Thus, to further investigate the individual cognitive facets of the actor subsystem we draw on social psychology and behavioural economics.

The theory of planned behaviour is the most commonly applied behaviour model in social psychology (St John et al., 2010), and provides guidance on individuals' cognitive decision-making processes. It suggests that the likelihood of an individual behaving

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