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Poverty and protected areas: An evaluation of a marine integrated conservation and development project in Indonesia

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ABSTRACT

Protected areas are currently the primary strategy employed worldwide to maintain ecosystem services and mitigate biodiversity loss. Despite the prevalence and planned expansion of protected areas, the impact of this conservation tool on human communities remains hotly contested in conservation policy. The social impacts of protected areas are poorly understood largely because previous evaluations have tended to focus on one or very few outcomes, and few have had the requisite data to assess causal effects (i.e. longitudinal data for protected and control sites). Here, we evaluated the short-, medium- and long-term impacts of marine protected areas (MPAs) that were specifically designed to achieve the dual goals of conservation and poverty alleviation (hereafter "integrated MPAs"), on three key domains of poverty (security, opportunity and empowerment) in eight villages in North Sulawesi, Indonesia. Using social data for villages with and without integrated MPAs from pre-, mid- and post-the five-year implementation period of the integrated MPAs, we found that the integrated MPAs appeared to contribute to poverty alleviation. Positive impacts spanned all three poverty domains, but within each domain the magnitude of the effects and timescales over which they manifested were mixed. Importantly, positive impacts appeared to occur mostly during the implementation period, after which integrated MPA activities all but ceased and reductions in poverty did not continue to accrue. This finding questions the efficiency of the short-term approach taken in many international donor-assisted protected area projects that integrate development and conservation, which are often designed with the expectation that project activities will be sustained and related benefits will continue to accumulate after external support is terminated.

1. Introduction

It is widely recognized that there is global biodiversity crisis, and environmental degradation is expected to accelerate with profoundly changing socioeconomic (e.g. human population growth, economic development and urbanization) and climatic conditions (Halpern et al., 2008; Rinawati et al., 2013; Thomas et al., 2004). Protected areas are commonly employed worldwide as a principal tool for maintaining biodiversity and key ecosystems services (Millennium Ecosystem Assessment, 2005). While protected areas as a management strategy for nature conservation has a long history, in the 1980s the prevailing top-down protectionist paradigm was replaced by an approach that was, at least in principle, more sensitive to the rights and needs of local people (Campbell et al., 2010). This shift took place in part because of concern about the disproportionate costs of conservation imposed on poor communities in developing countries, especially given the geographic juxtaposition of biological wealth and human poverty (Sunderlin et al., 2005). Further, there was growing recognition of the importance of gaining local communities' support for protected areas to achieve conservation goals, particularly in developing countries where resources for enforcement are scarce. The dual goals of conservation and poverty alleviation have since underpinned conservation philosophy and practice in most developing countries (Pelser et al., 2013). This approach to protected areas continues to be implemented under a number of guises, including community-based conservation, co-management, and integrated conservation and development.

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Despite the paradigm shift toward including poverty reduction as a goal of many protected areas, few evaluations of protected areas have assessed the social impacts of protected areas, instead focusing the biological domain (Fox et al., 2012; Miteva et al., 2012). Reviews of social impacts of protected areas (e.g. Agrawal and Redford, 2006; Carneiro, 2011; Mascia et al., 2010) have found mixed evidence. For example, economic impacts of protected areas – one of the most commonly assessed impacts – have been found to be both positive (e.g. Andam et al., 2010) and negative (e.g. Maliao and Polohan, 2008), and there are too few case studies from which to extract explanations and generalizations. Thus the social impacts of protected areas remain poorly understood (Ferraro et al., 2011; Mascia et al., 2010). Previous social impact evaluations have tended to suffer from two broad shortcomings: first, studies often examined one or very few impacts of protected areas (Agrawal and Redford, 2006; Mascia et al., 2010); and, second, few evaluations have had the requisite data to assess causal effects of protected areas (Andam et al., 2010).

The first shortcoming of existing social impact evaluations of protected areas – the focus on one or very few outcomes – has led to very narrow definitions of costs or benefits of conservation (Agrawal and Redford, 2006; Carneiro, 2011; Coad et al., 2008). For example, evaluations in developing countries have often measured poverty based solely on material and monetary assets (Pelser et al., 2013). Following Sen's (1976) criticism of this narrow definition of poverty, there has been a consensus in the theoretical literature on a multidimensional definition of poverty (Agrawal and Redford, 2006). The World Bank's strategy for poverty alleviation is based on such a definition, whereby poverty is due to a lack of opportunity, empowerment, and security (World Bank, 2001). However monetary-based poverty indices continue to be used in many protected area assessments (e.g. Andam et al., 2010; Ferraro et al., 2011).

The second barrier to advancing knowledge of the social impacts of protected areas is the dearth of data required to assess causal effects (Miteva et al., 2012). This is despite increasing interest in social monitoring of conservation projects, for example SocMon for coral reefs (Bunce et al., 2000). The few existing empirical impact evaluations have tended to rely on comparisons of outcomes in: (1) sites with and without protected areas for a single time period (e.g. de Sherbinin, 2008; Tobey and Torell, 2006); or (2) protected area sites before and after the intervention was implemented (e.g. Gjertsen, 2005; Leisher et al., 2012b). These two approaches rely on assumptions that are rarely met: that there was no difference between control and protected area sites prior to the intervention; and that there were no concurrent macro-changes that would affect outcomes (Gertler et al., 2011). Subsequently, there have been repeated calls for evaluations to use longitudinal data for protected and control sites to avoid the need for these assumptions (Ferraro and Pattanayak, 2006; Schmitt and Osenberg, 1996). Further, given that the outcomes of protected areas can be related to the duration of their implementation (Baral et al., 2007; Russ and Alcala, 2004), longitudinal analysis using multiple points in time, including ex-post assessment, is crucial for a comprehensive understanding of social impacts. The few social impact evaluations that have used longitudinal data for control and project sites exist only for terrestrial sites in Bolivia (Canavire-Bacarreza and Hanauer, 2012), and Thailand and Costa Rica, where a number of studies have used country-wide data sets (e.g. Andam et al., 2010; Ferraro and Hanauer, 2011; Ferraro et al., 2011). However, these studies adopted a narrow definition of poverty with monetary-based indices, and only assessed impacts over one time period.

Given the prevalence and planned expansion of protected areas – the target set by the Convention of Biological Diversity is to protect 10% of marine and 17% of terrestrial areas by 2020 (CBD, 2010) – understanding their social impact is of crucial policy importance, and is increasingly advocated as a priority topic of research (Sutherland et al., 2009). To address gaps in understanding of the social impacts of protected areas, we examined the impact of marine protected areas – designed to achieve the dual goals of conservation and poverty alleviation (hereafter "integrated MPAs") – on poverty of associated villages in North Sulawesi, Indonesia. Using data from pre-, mid-, and post-implementation for villages with and without MPAs, we asked "How do integrated MPAs affect key domains of poverty over the short, medium and long term?".

2. Materials and methods

2.1. Integrated MPAs in North Sulawesi

The Coastal Resources Management Project (CRMP; locally known as Proyek Pesisir) implemented integrated MPAs (all <14 ha) during 1997–2002 in four villages in North Sulawesi, Indonesia (Fig. 1). The project was jointly run by USAID and Indonesia's National Development Planning Agency (BAPPENAS), and cost over US$ 1.4 million (Pollnac et al., 2003). Integrated MPA plans were developed through a participatory planning process lasting two years, after which they were formally adopted by village ordinance. Notably, the village ordinances relating to the prosecution of poachers were not supported by any district or higher governance level legislation. Various development activities were simultaneously carried out under the CRMP, including improving access to drinking water, livelihood training and environmental education. After the withdrawal of external support in 2002, the villages continued to manage their MPAs to varying extents; currently MPA rules are not enforced in any of the villages and only the MPAs in the villages of Blongko and Talise are still marked with buoys.

2.2. Sampling

We studied the four villages in North Sulawesi, hereafter referred to as "MPA villages", pre-, mid-, and post-implementation of the integrated MPAs (1997, 2000, 2002, respectively; Pollnac et al., 2003) and in 2012, 10 years after the withdrawal of external support. To estimate the counterfactual outcomes, we concurrently studied four control villages (Fig. 1). These were selected to match key attributes of MPA villages that were likely to affect outcomes of the integrated MPAs, such as aspects of poverty and use of marine resources, including distance to markets, population size, and fisheries dependence. We used household surveys to gather quantitative data of several indicators of poverty, followed by semi-structured interviews with key informants, including heads of village, members of MPA groups, and traditional leaders. The two kinds of data were intended to triangulate results and aid our understanding of the possible causal mechanisms behind changes in poverty indicators. Households within villages were systematically sampled, whereby a sampling fraction of every *i*th household (e.g. 2nd, 3rd, 4th) was determined by dividing the total village population by the sample size (De Vaus, 1991; Henry, 1990). This sampling strategy ensured that the sample was random but also geographically representative. We surveyed over 2000 respondents during the entire study. At each village at each point in time, the number of surveys conducted per village ranged from 40 to 140, depending on the population of the village and available time at each site.

2.3. Poverty indicators

To develop a framework for assessing the impact of integrated MPAs on poverty, we drew on the World Bank's multidimensional