



Assessing Medium-term Impacts of Conservation Interventions on Local Livelihoods in Northern Cambodia



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SUMMARY

The success of conservation interventions often depends on the multifaceted and sometimes competing interests and motivations that lead local people to sustainably manage natural resources in the first place. Yet despite an extensive literature exploring the effects of conservation on human livelihoods, there is a lack of robust evidence about which type of conservation intervention works, for whom, and how. This is partly because the social impacts of conservation interventions often affect multiple aspects of human well-being, with changes taking place over long periods during which unintended feedbacks can occur. This paper assesses the medium-term impacts of Protected Areas (PAs) and of three Payment for Environmental Services (PES) projects on three socio-economic indicators across 16 villages in Northern Cambodia. We present a multi-period evaluation including three panel surveys over six years from villages inside and outside PAs to clarify the mechanisms through which social effects of conservation take place and how this translates into the development pathways adopted by households. While livelihood improvements were recorded across all villages, we found that PAs slightly reduce households' socio-economic status, though does not impede their development. PAs also protect traditional livelihoods. Participants in one of the three PES projects recorded higher economic status and agricultural productivity than non-participants, suggesting that there can be important social co-benefits to conservation interventions when programs are well-designed to respond to local contexts.

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1. Introduction

The effect of conservation interventions on human lives has long been a topic of contentious debate (Brockington & Wilkie, 2015; Wells, Brandon, & Hannah, 1992), continuing to this day as methods for assessing impacts constantly evolve (Baylis *et al.*, 2015; Woodhouse *et al.*, 2015). There is an increased consensus among international policy circles that conservation should at very least “do no harm” to the local populations affected by interventions (CBD, 1992; IUCN World Parks Congress, 2003, 2014), and a wide range of conservation interventions now aim at mitigating poverty, improving local livelihoods, and further, enhancing human well-being (Leisher, Samberg, van Buekerling, & Sanjayan, 2013; Milner-Gulland *et al.*, 2014). Despite an extensive literature exploring the effects of conservation on human livelihoods, studies rarely point to clear cut arguments about net outcomes and often suffer from lack of methodological robustness (McKinnon *et al.*, 2016; Oldekop, Holmes, Harris, & Evans, 2016). Credible evaluations of conservation interventions continue to be rare, especially

with regards to recent mechanisms for conservation such as Payments for Environmental Services (PES) (Miteva, Pattanayak, & Ferraro, 2012; Pattanayak, Wunder, & Ferraro, 2010; Samii, Lisiecki, Kulkarni, Paler, & Chavis, 2014).

Conservation projects rarely operate in isolation, with spatially overlapping interventions often having disconnected, if not conflicting objectives (Pender, Jagger, Nkonya, & Sserunkuuma, 2004; Scheidel, Giampietro, & Ramos-Martin, 2013). Teasing out heterogeneous effects within a fast-paced context featuring a myriad interventions at play is challenging partly because social changes take time to translate into observable household livelihood strategies (Baral, Stern, Heinen, Stern, & Heinen, 2007). Despite these challenges, understanding heterogeneous impacts is critical in order to determine which subsets of society benefit or incur costs from interventions.

Additionally, investigations of the depth, magnitude and distribution of the social effects of conservation must take a long-term perspective over multiple time periods in order to identify differentiated impacts as well as potential unintended consequences;

even after the intervention has ended (Pressey, Visconti, & Ferraro, 2015; Pullin et al., 2013). A landscape approach is necessary to identify the social impacts of interventions on different sub-groups within communities, and how these interacting effects vary geographically across multiple treatment and counterfactual sites (Agarwala et al., 2014; Pomeroy, Daw, Brown, Rosendo, & Pomeroy, 2011). Only by recognizing the different pathways through which livelihoods change within a broader socio-economic context can practitioners gain external and internal validation for projects and ultimately achieve both positive conservation and livelihood outcomes (Bottrill et al., 2014; Suich, Howe, & Mace, 2015).

Recent research using quasi-experimental methods for rigorous scientific impact evaluation have provided new and promising insights on the social effects of different types of conservation interventions on local communities. Studies from Bolivia (Hanauer & Canavire-Bacarreza, 2015), Cambodia (Clements & Milner-Gulland, 2015), China (Samii et al., 2014), Costa Rica (Ferraro & Hanauer, 2014; Robalino & Villalobos, 2014), Indonesia (Gurney et al., 2014), Mexico (Alix-Garcia, Sims, & Yañez-Pagans, 2015), Mozambique (Hegde & Bull, 2011) and Thailand (Andam, Ferraro, Sims, Healy, & Holland, 2010) point to conservation interventions having either no additional impact on local communities or making positive contributions to poverty mitigation, when compared to counterfactuals. More importantly, these studies have underlined the importance of not only exploring whether conservation interventions are beneficial or detrimental to local livelihoods, but also of understanding the mechanisms through which these effects take place (Brockington & Wilkie, 2015; Ferraro & Hanauer, 2015).

Due to the novelty of applying quasi-experimental designs to evaluate conservation intervention impacts and the difficulty in applying such designs retrospectively, few studies have been able to provide a medium to long-term, landscape perspective on conservation issues (Ahmadia et al., 2015). In fact, most such studies to date still focused on indicators determined via a single metric of poverty (Liu, Lü, & Yin, 2009), used recall data as baselines (Alix-Garcia et al., 2015), considered effects over a single time period (Hegde & Bull, 2011), or over a small number of study sites (Gurney et al., 2015).

Here we present one of the first multi-period impact evaluation study including three panel surveys over six years, to explore how conservation interventions have impacted households' development pathways in the context of a dynamic socio-economic landscape, increasing general economic development, and environmental change. The project was first evaluated three years after inception by Clements and Milner-Gulland (2015), to measure the effects of Protected Areas (PAs) and PES projects on three socio-economic indicators of local livelihoods in Northern Cambodia. This study takes Clements and Milner-Gulland's (2015) evaluation of short-term social impacts of conservation interventions to the medium term, in order to clarify the mechanisms through which social effects take place and how this translates into the development pathways adopted by households.

We aim to answer the following questions: First, how has household socio-economic status developed in a landscape of fast land use change? Second, how does this vary for different groups between and within villages? Third, how much do conservation interventions, in terms of PAs and additional PES programs, contribute to this change and on what time scales?

We first present an assessment of the effects of PAs on three socio-economic indicators in Northern Cambodia over two three-year time periods during 2008–14. We use quasi-experimental and mixed methods to estimate the changes in household economic status, rice harvests and rice surplus, in villages inside PAs compared to villages outside PAs across the landscape. We then

focus on a set of four core villages that have been the focus of PES activities since 2008 to assess the additional effect of PES on the three socio-economic indicators.

2. Study site

Cambodia has seen a series of fast-moving societal, political and economic transitions from the onset of the Khmer Rouge in 1975 and throughout the 1980s, when reconstruction post-Khmer Rouge begun under the scrutiny and choreography of international interveners (Hughes, 2003). These changes meant that Cambodia went from command economy to free-market economy, from war to peace, from authoritarian rule to democracy (Chandler, 1998; Hughes & Un, 2011; Kent, 2006). More recently, Cambodia has experienced rapid economic progress and globalization over the past decade (Mah, 2015). Despite a sharp reduction in 2009, Cambodia's GDP has been growing at nearly 7% during 2008–14, along with an average annual population growth rate of 1.7% during 2000–13 (Asian Development Bank, 2015; World Bank, 2013). Government figures show that the national poverty more than halved during 2004–11. But despite its economic growth and heavy overseas development aid, Cambodia still only ranks 138th on the Human Development Index, with a low GDP per capita at US\$1,020 in 2014 (Sobrado et al., 2013) and an estimated 20% of its population living under the poverty line (CIA, 2013). Twenty-nine percent of its population lives in urban areas, the remaining 71% living in rural areas and depending primarily of on agriculture for their livelihoods (NIS, 2014).

Government policies to promote development include infrastructure improvements such as road and communication networks, as well as the promotion of agri-industrial developments through the granting of land for Economic Land Concessions (ELCs). Disputes have arisen specifically around unfair eviction of local communities from their land and the patchwork pattern of ELCs granted over high-value forests and protected areas, thus affecting local livelihoods (Bues, 2011; Hor, Saizen, Tsutsumida, Watanabe, & Kobayashi, 2014; Ullenberg, 2009). Due to a continuing lack of transparency in the granting of ELCs, the mechanism has been implicated as primarily serving the interests of elite wealth accumulation through land grabbing for high value timber logging, rather than the intended provision of development and agricultural goods (Biddulph, 2010; Neef & Touch, 2012; Un & So, 2011; Vrieze & Naren, 2012). In fact, Cambodia has recorded the fifth highest rate of deforestation worldwide during 2000–12 (Hansen et al., 2013), primarily due to land grabbing and illegal logging (Beauchamp et al., in review; Davis, Yu, Rulli, Pichdara, & D'Odorico, 2015). These macro development drivers are often felt disproportionately in rural areas, where trade-offs from environmental depletion can hinder human development (LICADHO, 2009; Scheidel et al., 2013).

The Northern Plains of Cambodia is a landscape located in the province of Preah Vihear along the border with Thailand and Lao (Figure 1). It is one of the largest remaining areas of deciduous Dipterocarp forest and is considered an area of high biodiversity interest (Myers, Mittermeier, Mittermeier, da Fonseca, & Kent, 2000; O'Kelly et al., 2012). The core and contains two Protected Areas (PAs): Kulen Promtep Wildlife Sanctuary (KPWS) managed by the Ministry of Environment (MoE) and Preah Vihear Protected Forest managed by the Forestry Administration (FA) of the Ministry of Agriculture, Forestry and Fisheries (MAFF). While PVPF was declared in 2002, KPWS was established in 1993 as part of Cambodia's first protected area network.

Since 2005, international non-governmental organization the Wildlife Conservation Society (WCS) has assisted the MoE and FA's conservation efforts in both PAs (Clements & Milner-

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