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Understanding non-compliance: Local people's perceptions of natural resource exploitation inside two national parks in northeast Brazil

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ABSTRACT

Non-compliance with conservation regulations is a key issue for protected area management effectiveness in most parts of the world. Effectively managing such behaviours requires a clear understanding of who is non-compliant, what is driving their non-compliance, and what the likely conservation consequences of compliant and non-compliant behaviours are. However, such information is notoriously difficult to obtain due to the (understandable) reluctance of transgressors to discuss illegal activities. Here, we adopt the Kiping social survey method to assess the drivers of non-compliance with resource use rules in two national parks (Catimbau and Chapada Diamantina) in Northeast Brazil. The method is therefore used to support the exploration of suitable solutions for coping with non-compliance on the ground. We found high levels of social acceptability for illegal behaviours in both Parks, though hunting and cutting trees inside the park were viewed more negatively by local residents. Respondents from both areas generally supported the collection of plants and firewood, especially by poor people and local residents. Acceptance of illegal activities was statistically correlated with awareness of park regulations in both parks and, in Catimbau NP, it was also prevalent among older, poorer and less educated residents. To deter non-compliance, a mix of interventions from more coercive measures to softer instruments are recommended, especially in Catimbau NP where the area is not patrolled and the close proximity of indigenous lands gives rise to land- and resource-use conflicts.

1. Introduction

Protected Areas (PAs) are the primary policy instrument for conserving biodiversity internationally and their ability to achieve this objective largely depends on effective management (Hockings et al., 2006). For many PAs, the success of conservation initiatives is highly dependent on the active support of the local population in the form of compliance with park regulations (Mascia et al., 2014). Conversely, failure to curb illegal activities (cf. Cifuentes, Izurieta, & de Faria, 2000) may significantly weaken management effectiveness. Indeed, non-compliance with PA regulations is increasingly seen as a threat to the effectiveness of conservation policies in most parts of the planet (Conteh, Gavin, & Solomon, 2015; Solomon, Gavin, & Gore, 2015).

Non-compliant behaviour can have significant biodiversity and socioeconomic impacts at various scales and, if unresolved, can seriously compromise the ability of a PA to achieve its conservation objectives (Gavin, Solomon, & Blank, 2010; Keane, Jones, Edwards-Jones, & Milner-Gulland, 2008; Solomon et al., 2015). For example, illegal logging and illegal trade of timber and forest products have been identified as global threats to tropical forests in both Indonesian and Amazonian PAs (Barber, Cochrane, Souza, & Laurance, 2014; Tacconi, 2012; Yonariza & Webb, 2007). Illegal wildlife hunting and trade has been recorded in PAs of developed and developing countries with serious consequences on population dynamics (Carvalho & Morato, 2013; Gandiwa, Heitkönig, Lokhorst, Prins, & Leeuwis, 2013; Rauset et al., 2016). Illicit resource extraction in PAs has also been observed at a local scale, giving rise to conflicts between users and PA managers in many parts of the world (Weladji & Tchamba, 2003; Anthony, 2007; Robbins, McSweeney, Chhangani, & Rice, 2009).

Illegal activities can be particularly problematic in developing countries where resources available for conservation and PAs are limited (Balmford et al., 2002; Bruner, Gullison, & Balmford, 2004), land ownership and resource tenure are unclear (Wunder, 2007) and where rural communities are often highly dependent on natural resources such

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as firewood, medicinal plants and bushmeat (Vedeld, Angelsen, Bojö, Sjaastad, & Kobugabe Berg, 2007). The legal restriction on the use of these resources by PAs is often perceived as a loss of rights by local communities, increasing social conflicts and leading to negative attitudes towards PAs and/or non-compliant behaviour: the illegal extraction of natural resources from within the park boundaries (Baral and Heinen 2007a; West and Brockington 2006; Yonariza and Webb 2007).

In this context, there are at least two reasons to study compliance/non-compliance with conservation rules. Firstly, while many studies have demonstrated the consequences of non-compliant behaviours across scales, our understanding of conservation "crimes" to date is still fragmented and requires critical, comprehensive and interdisciplinary approaches (Gore, 2011). Secondly, the emerging compliance "crisis" may indicate that traditional instruments for law enforcement are ineffective to deter non-compliance with conservation and environmental regulations. Consequently, there is an urgent need to find alternative solutions and design more tailored interventions to deter/prevent non-compliant behaviours (Moreto & Gau, 2017).

The most common response to non-compliance is to implement measures to strengthen the enforcement of conservation rules through, for example, more severely punishing infractions. Such a strategy is indicative of a classic "command-and-control" approach to conservation where resources are primarily directed towards monitoring for rule violations and processing law-breakers. While several studies have demonstrated the effectiveness of such punishments as a strategy for reducing illegal hunting and poaching (Hilborn et al., 2006; Jachmann, 2008), considerable resources are required to implement well-organized systems that include mechanisms for patrolling and successfully punishing rule-breakers (da Silva and Bernard, 2015; Keane et al., 2008; St. John, Mai, & Pei, 2014). Moreover, punishing members of local communities for committing infractions against PAs can have wider and unintended consequences such as weakening trust between people and park authorities (Infield and Namara, 2009). More generally, the implementation of coercive strategies opens a space for corruption since the decision to report/prosecute may be financially negotiable in some cultures (Jin-Li, Huang, & Chu, 2004). In other words, if officials are willing to shut their eyes (for a price), local people can easily avoid fines without needing to change their behaviour (Aklin, Bayer, Harish, & Urpelainen, 2014).

An increasingly used alternative to 'command and control' conservation strategies, especially in the developing world, is the implementation of economic incentives (e.g. alternative livelihood schemes, conservation-development programmes, pro-poor conservation programmes, payment for ecosystem service schemes, etc.) to deter non-compliant behaviours (Duffy, St John, Büscher, & Brockington, 2015). However, these initiatives have also been criticized for intensifying inequalities which, in turn, can actually increase non-compliance at a local scale (Gibbes and Keys, 2010). Moreover, financial instruments and economic incentives may have a "crowding out" effect (Pannell, 2008; Fisher, 2012) as they may not necessarily reinforce people's intrinsic motivations to engage in biodiversity and ecosystem conservation (Rode, Gómez-Baggethun, & Krause, 2015).

Another approach is to create/strengthen education and outreach campaigns focused on promoting pro-conservation behaviours and attitudes. If well planned and implemented, such an approach can generate considerable long-term benefits, raising environmental awareness and engaging more people in conservation-friendly behaviours (Arias, 2015; Holmes, 2003a). Nevertheless, the ability of these schemes to influence individual behaviours such as non-compliance remains uncertain, since the causal link between knowledge and behaviours is, at best, tenuous (Schultz, 2002; Schultz, 2011).

Together with the traditional "carrots, sticks, and sermons" approach (Bemelmans-Videc, Rist, & Vedung, 1998), new environmental policy instruments (NEPIs) can be applied to increase compliance. NEPIs are "soft" environmental policy measures that were first introduced as more flexible alternatives to the traditional command-and-control approach. They are characterized by a more flexible, market-oriented, and multi-level and multi-stakeholder approach to environmental governance (Jordan, Wurzel, & Zito, 2003). For example, a new generation of payments for ecosystem services (Compensation and Rewards for Environmental Services − CRES) have been framed and implemented in the developing world and have gained the approval of conservation organizations for paying particular attention to poverty reduction, rural empowerment and social justice, ecosystem governance and management (Swallow et al., 2009). More generally, community-based conservation (CBC) models have been broadly adopted as a post-modern strategy to deal with non-compliance with PA regulations, enhancing PAs as a common goal and proactively involving local communities in PA management (Berkes, 2004; Moreto, Brunson, & Braga, 2016). Nevertheless, many conservationists remain skeptical, fearing that CBC approaches may be more effective at changing users' attitudes rather than their behaviours (Infield and Namara, 2001; Lepp and Holland, 2006).

New technologies (remote-sensing, drones, etc.) and global information infrastructure (i.e. the Internet) have also recently provided an innovative and low-cost way to support the enforcement of conservation and PAs regulations (Fuller, 2006; Kretser et al., 2015). Nevertheless, these new tools raise new concerns about data privacy, data security, and regulatory reach (di Vimercati, Genovese, Livraga, Piuri, & Scotti, 2013). Choosing between these alternative approaches for reducing non-compliance with a PA rules therefore requires a clear understanding of who is non-compliant, what is driving their non-compliance, and what the likely conservation consequences of compliant and non-compliant behaviours are (Arias, 2015; Gavin et al., 2010). Answering these key questions will provide information for optimal policy choices and allow managers and conservationists to design more efficient interventions (Solomon et al., 2015). However, collecting such data is by no means straightforward: direct observation of illegal activities is practically challenging, while indirect measures (e.g. through social surveys) are often beset with biases and uncertainties (Loibooki, Hofer, Campbell, & East, 2002; Nepal and Weber, 1995; Razafimanahaka et al., 2012). These issues have led to the development of a new generation of methods specifically designed for collecting sensitive data (Fairbrass, Nuno, Bunnefeld, & Milner-Gulland, 2016; St. John, Edwards-Jones, Gibbons, & Jones, 2010; Warner, 1965). For example, it has been claimed that far more robust data on illegal activities can be gained by carefully analysing local people's attitudes to resource use and their estimates of the illegal behaviour of their peers (St. John et al., 2014). Moreover, the study of perceptions of local people concerning conservation issues have been recently advocated as a meaningful way to provide insights and evidence for improving monitoring, evaluating, and adapting conservation programmes and policies (Bennett, 2016). An additional challenge is that the relative importance of socio-economic, environmental and cultural factors driving non-compliance may change for different behaviours and across different contexts (Rizzolo, Gore, Ratsimbazafy, & Rajaonson, 2017). This is partly because there is large spatial and temporal variation in social norms about whether a given behaviour is socially acceptable and to what extent rules and enforcement strategies (e.g. fines) are perceived as just and fair within that particular context (Keane et al., 2008; St. John et al., 2014).

Social acceptability − defined as a "a measure of support towards a set of regulations, management tools or towards an organization by an individual or a group of individuals based on geographic, social, economic and/or cultural criteria" (Thomassin, White, Stead, & David, 2010) − is therefore a key aspect for the success of a PA. Social acceptability is also used as a measure of legitimacy, defined as "the acceptance and justification of shared rule by a community" (Bernstein, 2005). Specifically, the extent to which an individual or community is likely to accept/legitimate different environmental policy instruments, and thereby, support regulations and decisions, depends upon social