



# A systematic review of motivational values and conservation success in and around protected areas

Elijah R. Cetas and Maï Yasué ¶

Quest University Canada, 3200 University Boulevard, Squamish, BC V8B 0N8, Canada

**Abstract:** *In conservation projects in and around protected areas (PAs), a suite of policy instruments are used to promote conservation behavior in local people. Few studies have related psychological research on motivational values to conservation in PAs. We conducted a systematic review of 120 peer-reviewed articles to assess the relative frequencies of policy instruments that aimed to foster intrinsic versus extrinsic motivations to conserve. We examined how the type of motivation engendered by the instrument (i.e., intrinsic or extrinsic motivation and based on the description of how the project was designed and implemented) influenced the ecological, economic, and social success of the project. We assessed the success of the project in only the case studies that included a quantitative or qualitative analysis of success. Projects designed to foster at least one intrinsically motivating instrument were 3 times more likely to meet socioeconomic or ecological goals. Although certain types of instruments such as payments or fines tended to be based on extrinsic motivators more often than education or monitoring programs, several successful projects involving payments or fines were linked to intrinsic motivation in the local community. Thus, our results suggest that rather than debating the relative merits of specific types of policy instruments, conservationists may have more success by focusing on how different motivators, suited to specific contexts, can better empower local communities to conserve. Broadly, our results suggest the current emphasis on social justice and well-being of local communities is a positive step toward protecting the world's remaining biodiversity.*

**Keywords:** community-based conservation, ICDP, meta-analysis, psychology, self-determination theory

Una Revisión Sistemática de los Valores Motivacionales y el Éxito de Conservación En y Alrededor de las Áreas Protegidas

**Resumen:** *En los proyectos de conservación en y alrededor de las áreas protegidas (APs), un conjunto de instrumentos políticos es usado para promover el comportamiento de conservación entre la gente local. Pocos estudios han relacionado a la investigación psicológica sobre los valores motivacionales con la conservación en las APs. Realizamos una revisión sistemática de 120 artículos revisados por colegas para valorar las frecuencias relativas de los instrumentos políticos que buscaban fomentar las motivaciones intrínsecas para conservar contra las extrínsecas. Examinamos cómo los tipos de motivación generados por el instrumento (es decir, la motivación intrínseca o extrínseca y basado en la descripción de cómo el proyecto fue diseñado e implementado) influyeron sobre el éxito ecológico, económico y social del proyecto. Valoramos el éxito del proyecto sólo en los estudios de caso que incluyeron un análisis cualitativo o cuantitativo del éxito. Los proyectos diseñados para promover por lo menos un instrumento de motivación intrínseca tuvieron tres veces más probabilidad de alcanzar los objetivos ecológicos o socio-económicos. Aunque ciertos tipos de instrumentos, como los pagos o las multas, tuvieron la tendencia de estar basados en motivadores extrínsecos más veces que la educación o los programas de monitoreo, muchos proyectos exitosos que involucraban pagos o multas estuvieron conectados a la motivación intrínseca en la comunidad local. Por esto, nuestros resultados sugieren que en lugar de debatir los méritos relativos de los tipos específicos de instrumentos políticos, los conservacionistas pueden tener más éxito si se enfocan en cómo los motivadores diferentes, ajustados*

¶[maiyasue@gmail.com](mailto:maiyasue@gmail.com)

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*a contextos específicos, pueden empoderar de mejor manera a las comunidades locales para conservar. En general, nuestros resultados sugieren que el énfasis actual sobre la justicia social y el bienestar de las comunidades locales es un paso positivo hacia la protección de la biodiversidad mundial restante.*

**Palabras Clave:** conservación basada en la comunidad, ICDP, meta-análisis, psicología, teoría de la auto-determinación

## Introduction

In the past 30 years, increased awareness on the ecological impacts of local people living around protected areas (PAs) (Struhsaker et al. 2005; Hilborn et al. 2006) as well as the adverse social impacts of PAs (West et al. 2006; Brockington & Wilkie 2015) has led to community-conservation projects in and around PAs. These projects provide incentives such as material benefits (e.g., payments, economic development opportunities, and harvest rights) and nonmaterial benefits (e.g., training, social capital, or autonomy) as well as disincentives such as fines to help shape behavior of local communities and thereby protect biodiversity (DeCaro & Stokes 2008; Cowling 2014). However, given the challenges of making reliable predictions about how complex social-ecological systems will respond to novel interventions, many of these projects have had unintended consequences and have failed to benefit biodiversity (Barrett et al. 2001; Salafsky & Margoluis 2004) or improve the well-being of local communities (Adams et al. 2004; Igoe & Brockington 2007).

Psychological research on attitudes and motivations can help conservationists design and execute fair and effective conservation interventions (DeCaro & Stokes 2008; St John et al. 2010). Theory-based and empirically tested studies on motivational values have demonstrated similarities in core human values across different cultures and 82 countries (Grouzet et al. 2005; Schwartz 2006). Thus, linking this research to conservation may improve predictions of the effects of a novel intervention on local communities in different countries and sociopolitical contexts.

Self-determination theory (SDT) (Ryan & Deci 2000) posits 2 types of human motivation. Intrinsic motivation arises from within an individual because of spontaneous enjoyment and interest in a particular activity (e.g., planting trees for the joy of planting trees). Empirical studies in SDT demonstrate that intrinsic motivation is enhanced when 3 basic and universal psychological needs (autonomy, competence, and relatedness) are satisfied (Deci et al. 1999). People feel autonomous when they can affect their own future. In conservation, communities may experience more autonomy when they decide how and when payments will be distributed (Ostrom 1990) or if they voluntarily engage in a project because they believe it is consistent with their values (Ryan & Deci 2000). People feel competence when

they can act on a motivation. For example, feelings of competence may be enhanced when people learn new planting techniques and receive positive feedback. Finally, people experience relatedness when they feel connected to familiar people or places. Instruments that work through existing institutions or social networks or emphasize the connection between people and the environment may promote feelings of relatedness.

In contrast, extrinsic motivation (such as rewards or punishment) arises outside the individual. Although most policy instruments that are offered to a local community could be considered extrinsic because they originate outside the local community, these instruments vary along a continuum based on the degree to which they foster the conditions for the communities to feel like the motivation comes from the self (i.e., degree of self-determination) (Ryan & Deci 2000). For example, an individual could be planting a tree only for payments even though she/he sees the act of planting a tree as being alien to her/his own values or alternatively she/he could be planting a tree because she/he sees that planting trees to combat desertification as part of her/his own identity and values, even though she/he thinks tree planting is an unpleasant work. The latter example would be considered more autonomous and self-determined and thus closer to intrinsic motivation. Although even the most nonautonomous forms of extrinsic motivators are effective at shaping short-term behavioral change (Skinner 1976), intrinsic motivation and more autonomous forms of extrinsic motivators are more likely to lead to long-term, stable environmental beliefs (Sheldon et al. 2011), which in certain social contexts can lead to environmental behaviors (Kollmuss & Agyeman 2002).

Using the psychological framework of SDT, we built on more exploratory systematic reviews and meta-analyses that identified the sociopolitical and ecological factors that enhanced conservation success (Waylen et al. 2010; Andrade & Rhodes 2012; Brooks et al. 2012; Cinner & Huchery 2014). Specifically, we examined the relative prevalence of policy instruments fostering intrinsic or extrinsic motivation. In addition, we examined whether projects designed to foster intrinsic motivations were more effective at meeting the socioeconomic and ecological goals of the PA relative to projects designed around extrinsic motivators for conservation. To our knowledge, this is the first systematic review that examines how motivation influences PA outcomes. This research is timely because of

the recent surge of interest in largely extrinsic policy instruments in PAs, such as enforcement (Struhsaker et al. 2005; Gandiwa et al. 2013) and market-based instruments (Wunder 2013; Rode et al. 2015).

## Methods

### Literature Search and Coding

We followed established procedures for systemic reviews of conservation literature (Pullin & Stewart 2006). We used keyword searches in the ScienceDirect database from 10 to 30 May 2015 to identify articles that were suitable to include in the review (Supporting Information). We included an article in our study if it indicated, in the abstract, a qualitative or quantitative assessment of a conservation intervention aimed at adjusting the behavior of local communities living near PAs. Review papers, other meta-analyses, and papers published before the year 2000 were excluded. To minimize pseudoreplication of having repeated papers from the same case or different cases from the same paper (13% of articles), we randomly selected only one article per protected area or one case study per article and ran statistical analyses to assess correlation of error terms for projects in the same country (Supporting Information). In total, 120 articles were included.

For each paper, we recorded local and national sociopolitical and ecological characteristics of the study areas. We recorded variables that were included in previous meta-analyses and empirical research on the effects of conservation interventions (Struhsaker et al. 2005; Waylen et al. 2010; Andrade & Rhodes 2012; Brooks et al. 2012).

### Sociopolitical and Ecological Contexts

We used the International Union for Conservation of Nature (IUCN) ranking system to categorize the type of PA of each case study. Eleven percent of the articles we reviewed specified the IUCN ranking, thus for the remaining PAs we obtained the IUCN category from the Protected Areas Database (30%) (IUCN 2015). If a PA was not listed on the database, we assessed category based on contextual information in the articles (59%). We first recorded the IUCN rank, and then aggregated these groupings into 2 categories strict protection (I–IV) and sustainable use (V and VI) PAs.

We also recorded the number of years since the establishment of a PA. This information was found either within each article or on the ProtectedPlanet database (IUCN 2015).

Participation levels were coded from 1 (token participation or manipulation) to 7 (self-mobilization) on the basis of the Pretty (1995) typology of participation for development. Levels of participation were assessed based

on information in the article about how the conservation project engaged with the local community.

Similar to previous meta-analyses (Brooks et al. 2012), we obtained the human development index (HDI) values from the United Nations Human Development Report for the closest year of each article's publication (UNDP 2014). Because corruption can harm natural resource protection (Laurance 2006), we also recorded the control of corruption dimension of the World Bank Governance index (The World Bank 2013) for the closest year of each article's publication. Given the variation in development and corruption within a country, such national-level indicators have limits. However, there were no comparable smaller scale indicators that we could use. We categorized the ecological context as terrestrial or marine.

### Types of Projects and Incentives

We grouped policy instruments into 8 categories: alternative livelihoods, community monitoring, direct payments, education, infrastructure development, land ownership, regulation, and resource access (see Supporting Information for examples of each type). The majority of conservation projects (84%) used more than one type of policy instrument (mean [SD] = 2.7 [1.2] policy instruments per project) to shape behavior.

The policy instruments described in a conservation project were coded as either extrinsic or intrinsic depending on the paper's description of the social context of how the instrument was implemented to motivate local people to conserve (Table 1). Specifically, we considered whether the instrument was offered to the local community in a way that maintained the communities' feelings of self-determination and autonomy (Ryan & Deci 2000) as well as feelings of competence and community. See Supporting Information for details.

### Project Success

When goals were explicitly stated, these were used to assess project success. When goals were not explicitly stated, we deduced the goals of the project based on the history of socioeconomic or ecological challenges that were noted in the study area description (Supporting Information). We assumed the goals aimed to mitigate these challenges. We only coded the social, economic, or ecological outcomes if authors measured these with systematic qualitative or quantitative methods.

Projects can impact different members of communities differently depending on factors such as proximity to PA, gender, access to capital, and occupation (Agrawal & Gibson 2001; Karki 2013). When projects indicated social or economic benefits for an identified group and a negative impact on another identified group, we did not code the outcome. Consequently, social outcomes of 5 articles were excluded. Similarly, if the project

**Table 1.** Five most common types of policy instrumentation and descriptions of implementation approaches that fostered intrinsic versus extrinsic motivations for conservation.

<i>Instrument type</i>	<i>Intrinsic</i>	<i>Extrinsic</i>
Alternative livelihoods	goals and methods decided by stakeholder meetings; strengthen existing local social organizations; offer opportunities for diverse livelihoods agreed upon through dialogue (e.g., Mena et al. 2006)	livelihood strategy predetermined and developed by external players with limited opportunity for feedback from community about effectiveness of new institutions or technology and perceived equity of benefits (e.g., Castrejón & Charles 2013)
Community monitoring	local people trusted to perform scientific monitoring (stakeholder-driven monitoring); monitors indicators important to community members; empowers through education; incorporates traditional ecological knowledge (e.g., Danielsen et al. 2005)	no incorporation of traditional ecological knowledge; information used only by park staff and not presented to community; rigid hierarchy in monitoring and little training beyond necessary skills for community members (e.g., Balint & Mashinya 2006)
Direct payments	ability to opt out; payments made to existing community groups and widely distributed or paid to people selected or informed by local input (e.g., Mbaiwa & Stronza 2011)	participants coerced into program and payments are the only means of community participation; structure of payment schemes to individuals designed with no dialogue with or feedback from the community (e.g., Glaser et al. 2010)
Education	supports appreciation of intrinsic value of nature and community pride or social capital; locally led; uses social networks; enhances skills and capacity for activities that community values (e.g., Lu et al. 2005)	ignores traditional ecological knowledge and posits that western beliefs are the only view. Educates on regulations and rules only rather than about broader values (e.g., Wise 2014).
Regulations	created through extensive stakeholder dialogue; enforced and monitored with community support for rules (e.g., Cudney-Bueno et al. 2009)	rules imposed by small external group; little community legitimacy involvement in decision making; no clear delineation of rules; heavy use of fines (e.g., Hind et al. 2010)

demonstrated both positive and negative impacts for a given outcome category (i.e., social, economic, or ecological), we did not code the result. The social outcomes of 6 articles were omitted due to these conflicting results. However, opposite outcomes in different outcome categories (e.g., positive for economic but negative for social) were coded.

### Intercoder Reliability and Analyses

After coding the first 80 articles through the process of discussion and independent coding described above, we tested the intercoder reliability of 23 haphazardly selected articles between an author (E.R.C.) and a trained research assistant. The average Krippendorff's alpha ratio for all variables was 0.90 (SD 0.09).

A binary logistic model predicted the likelihood that at least one of the social, economic, or ecological goals of the project was met given the following independent variables: national HDI, governance score (corruption perception index), years since the establishment of the PA, ecosystem category (marine vs. terrestrial), IUCN PA category (strict protection vs. sustainable use), community participation levels, and the proportion of instruments used in a specific project that fostered intrinsic (as opposed to extrinsic) motivations to conserve. A range of interaction terms were visually examined and statistically tested, but none had predictive value. Model saturation

precluded more interaction terms. Likelihood ratio tests ( $\alpha < 0.05$ ) informed model optimization via backward elimination (Zuur et al. 2009) and tests for multicollinearity were conducted (Supporting Information).

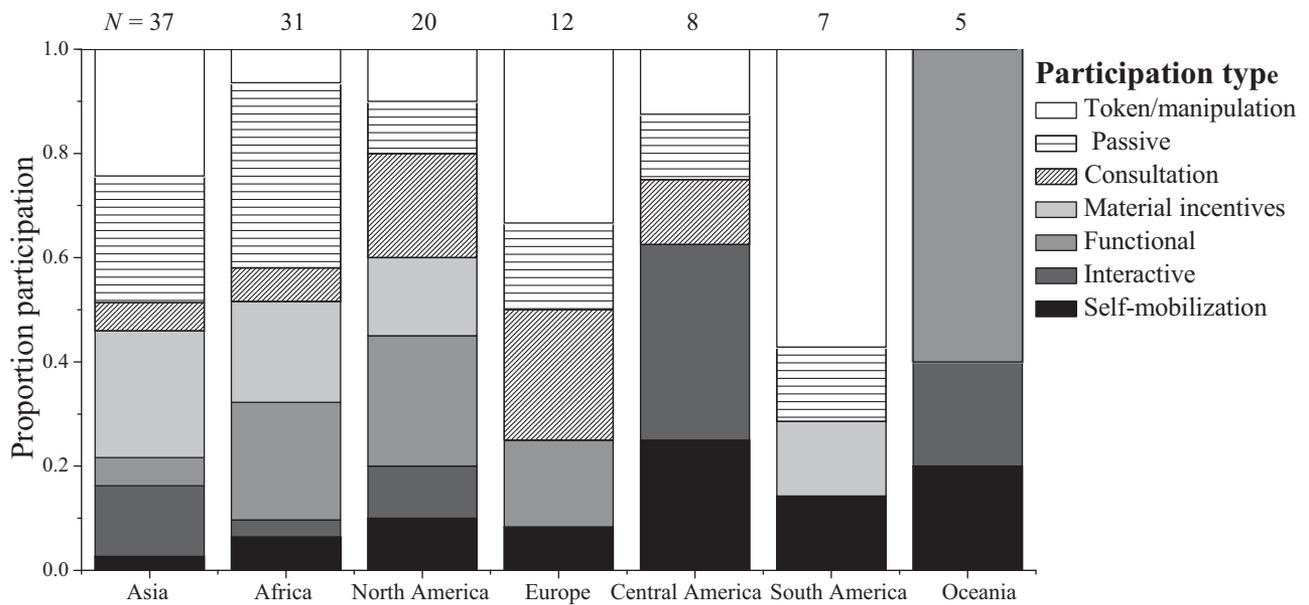
Different factors are likely to influence the ecological, social, or economic success of a conservation project. To gain finer resolution, we also conducted 3 separate analyses for the ecological, social, or economic success of the project.

### Results

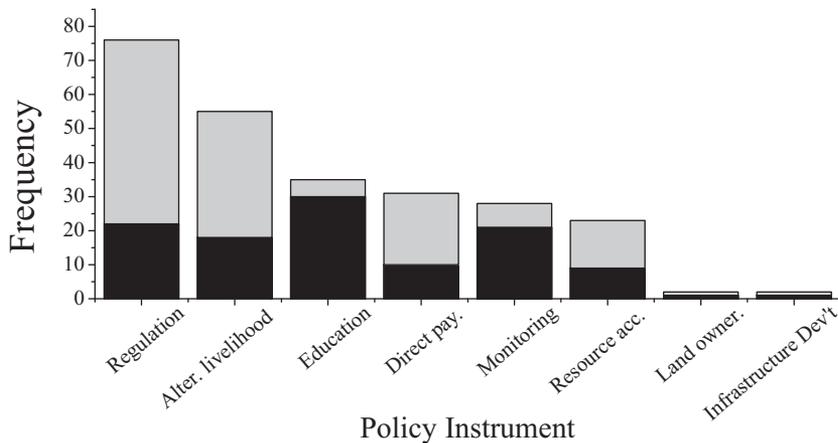
We included case studies from all continents except Antarctica (Fig. 1) in both marine ( $n = 58$ ) and terrestrial ( $n = 62$ ) PAs and both PAs of IUCN categories I–IV (hereafter protective [ $n = 55$ ]) and IUCN categories V and VI (hereafter sustainable [ $n = 65$ ]). There were case studies from low ( $<0.55$ ,  $n = 30$ ), moderately low (0.55–0.70,  $n = 36$ ), intermediate (0.70–0.80,  $n = 33$ ), and high HDI countries (0.80,  $n = 21$ ). Case studies had generally low participation levels, the majority were categorized as token or passive participation (Pretty 1995) (Fig. 1).

### Policy Instruments and Motivation

Regulations, alternative livelihoods, and education projects were the most commonly cited policy instruments



**Figure 1.** The proportion of community participation levels (Pretty 1995) by continent (n = 120) in protected-area management and establishment (the darker the shading, the greater the participation; numbers above bars, number of case studies in each continent; token/manipulation, pretence of participation only, no real power; passive, unilateral announcement from administration; consultation, people used as sources of information before decisions are made but no obligation by administrators to listen to people; material incentives, people and administration exchange resources [e.g., food and labor]; functional, some shared decision making, people’s presence in administration; interactive, joint analyses, local control over local decision, self-mobilization [i.e., people take their own initiative, have control over resources, and decisions] [Pretty 1995]).



**Figure 2.** Frequencies of different types of policy instruments (253 total instruments) cited in 120 studies involving the assessment of a conservation intervention aimed at adjusting the behavior of local communities living near protected areas (black, instruments that foster conditions for intrinsic motivations for conservation; gray, instruments that foster conditions for intrinsic or extrinsic motivations for conservation).

(Fig. 2). Regulation and alternative livelihood instruments were implemented in a way that would tend to foster extrinsic motivation for conservation, whereas education projects appeared to foster intrinsic motivation (Fig. 2).

The percentage of policy instruments that used intrinsic motivators was similar in marine and terrestrial PAs (45% and 38%). The percentage of instruments fostering intrinsic motivation was similar in low HDI (33%), moderately low HDI (39%), and intermediate (41%) HDI countries, whereas high HDI countries had more projects that fostered intrinsic motivation (60%).

**Factors Predicting the Success**

Of the 120 case studies, 97 could be included in the outcome analysis. Eleven articles were omitted because of mixed results in terms of social impacts, and 12 articles were omitted because the articles did not attempt to empirically measure a social, economic, or ecological outcome.

The proportion of intrinsically motivating policy instruments influenced the likelihood of ecological, social, and economic success of the projects (Table 2, Fig. 3). Out of the 7 independent variables tested to predict social,

**Table 2. Parameter estimates for minimum adequate binary logistic model predicting the success of community-conservation projects.<sup>a</sup>**

Model variables	Logit (SE)	Z	p
Social, economic, or ecological success <sup>b</sup>			
intercept	-0.9 (0.3)	-3.0	0.002
proportion of intrinsic instruments	2.9 (0.6)	4.5	<0.0001
<i>n</i> = 97, Nagelkerke's <i>R</i> <sup>2</sup> = 0.32			
Social success <sup>b</sup>			
intercept	-0.37 (0.5)	-0.75	0.45
proportion of intrinsic Instruments	3.4 (0.8)	4.2	<0.0001
Years since protected-area establishment			
	-0.03 (0.01)	-2.3	0.02
<i>n</i> = 71, Nagelkerke's <i>R</i> <sup>2</sup> = 0.45			
Economic success			
intercept	-5.7 (2.0)	-2.9	0.004
participation	1.0 (0.5)	2.1	0.03
proportion of intrinsic instruments	3.1 (1.8)	1.9	0.06
<i>n</i> = 37, Nagelkerke's <i>R</i> <sup>2</sup> = 0.61			
Ecological success			
intercept	-1.0 (0.6)	-1.9	0.07
proportion of intrinsic instruments	3.6 (1.2)	3.1	0.002
<i>n</i> = 38, Nagelkerke's <i>R</i> <sup>2</sup> = 0.35			

<sup>a</sup>The initial model included National human development index, governance scores, years since protected-area (PA) establishment, whether it was a marine or terrestrial environment, International Union for Conservation of Nature PA category, community participation levels, and whether the project fosters intrinsic versus extrinsic motivation to conserve.

<sup>b</sup>Participation had a marginally significant ( $0.05 < p < 0.1$ ) positive effect on success for these models. Adding participation as a variable increased *R*<sup>2</sup> to 0.34 and 0.49 in models on social, economic, or ecological success and social success, respectively.

economic, and ecological success, intrinsic motivation was the only variable that was significant in all models. Given the complexity and challenges of predicting socioecological systems, the final parsimonious models accounted for a moderate proportion of the variation (Nagelkerke's *R*<sup>2</sup> in Table 2). In addition to the proportion of intrinsically motivating policy instruments, the number of years since a PA had been established was inversely correlated to social success (Fig. 4a). Case studies with greater participation levels were also more likely to succeed economically (Fig. 4b).

## Discussion

### Project Effectiveness

Our study provides evidence that SDT may be a useful theoretical framework with which to understand and predict the social factors that should be considered when

designing and implementing community-conservation project (DeCaro & Stokes 2008; Rode et al. 2015). Projects that supported intrinsic motivation were more likely to succeed in meeting socioeconomic and ecological goals. Although we could not conclusively determine whether enhanced intrinsic motivation caused greater success, experiments in SDT (Deci et al. 1999; Festré & Garrouste 2014) and previous case studies on factors promoting the success of community-conservation projects suggest that this may be the case. For example, providing personal choice (Martin et al. 2014), opportunities for substantive participation (Andrade & Rhodes 2012), and engaging existing cultures (Waylen et al. 2010) and institutions (Cinner & Huchery 2014) may have led to more successful projects because they fostered feelings of autonomy. Similarly, providing opportunities for personal growth and feelings of competence (Waylen et al. 2010) through meaningful feedback (DeCaro & Stokes 2008) and skills training (Danielsen et al. 2005) may better motivate communities to conserve by enhancing feelings of competence. Finally, engaging in social webs and informal networks (Gutiérrez et al. 2011) of local communities may lead to more effective conservation because they enhance feelings of relatedness.

Our results suggested that intrinsic motivation was a better predictor of social success than participation. Although participation appeared to have significant effects on social success without intrinsic motivation in the model, the effect of participation was only marginally significant when we included intrinsic motivation into the model. These results emphasize the point that although participation is important (Andrade & Rhodes 2012), it should not be viewed as a panacea or a goal in itself (Berkes 2009). Perhaps instead, it is as an important first step toward long-lasting, autonomous conservation projects. Even in projects with high participation, other sociopolitical factors such as weak enforcement, poor monitoring, and low social capital could lead to both lower intrinsic motivations and failure to meet project objectives (Castrejón & Charles 2013). Instead of focusing only on involving the community, the primary focus should be on considering how all aspects of project design and implementation (including participation) enhance feelings of intrinsic motivation in the community.

### Intrinsic Motivation and Conservation Instruments

Although each of the policy instruments differed in terms of the proportion of cases that fostered intrinsic motivation to conserve, we found examples of both intrinsically and extrinsically motivating case studies for all instrument types. This finding emphasizes the point that beyond selecting the appropriate type of policy instrument, practitioners need to consider the social context of how each of the policy instruments are implemented in order

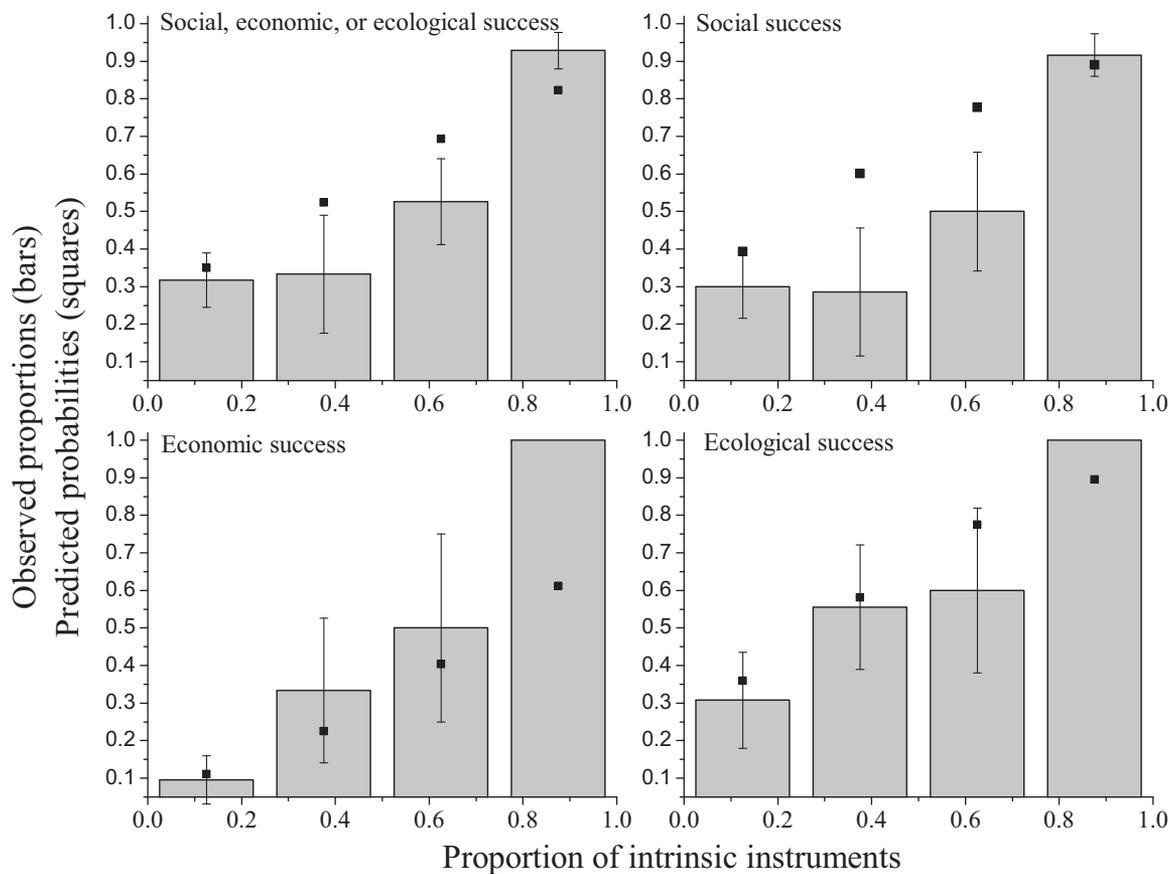


Figure 3. Effect of the proportion of instruments designed to foster intrinsic motivations on the proportion of successful conservation projects (social, economic, or ecological success in combination or separate) in and around protected areas (bars) (vertical lines, binomial error bars) and the predicted probabilities of the proportion of successful projects from the model (black squares). In the logistic regression, the other significant independent variables (i.e., years since protected-area establishment and participation) were set to mean values.

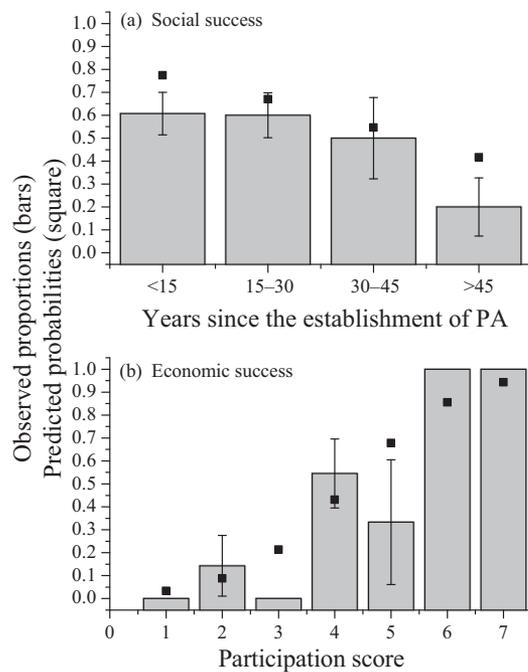
to consider the type of motivation engendered (Festré & Garrouste 2014).

Given that alternative livelihoods were initiated partly as a response to the negative social impacts of conservation in impoverished communities (Brosius et al. 2005), it was unexpected that alternative livelihood schemes were frequently categorized as extrinsic motivators. Alternative livelihood projects may challenge feelings of self-determination because occupations and livelihood strategies are central to an individual’s identity and social networks (Pollnac & Poggie 2008; Torell et al. 2010). Moreover, this type of project could threaten feelings of autonomy because these new and often predetermined livelihood strategies are often presented by external players (Ferraro & Kiss 2002). Given the complexity of alternative livelihood projects (Salafsky & Margoluis 2004), unintended side effects, such as elite capture of the benefits, may erode social capital and further disenfranchise the poor (Igoe & Brockington 2007; Dressler & Roth 2011).

In contrast, community education and monitoring projects were most likely to foster conditions for in-

trinsic motivation. These projects can directly enhance feelings of autonomy or competence by enhancing community capacity to manage resources (Danielsen et al. 2005; Pohl et al. 2010) and promoting group identity and pride in support for conservation (Sommerville et al. 2010).

Direct payment schemes were usually coded as extrinsic motivators. This is because communities frequently had little decision-making power over the structure of the payments (i.e., who to give them to and how much) (Young 2001; Clifton 2013). Previous research suggests that payments may undermine intrinsic motivation because payments can be perceived as controlling by the recipient and thereby reduce feelings of autonomy (Festré & Garrouste 2014). Other studies suggest that payments may crowd out moral obligation toward other people or species and thereby undermine intrinsic motivation to conserve (Gneezy & Rustichini 2000; Bowles 2008). However, it was notable that about one-third of the direct payments were categorized as fostering intrinsic motivation. These payment schemes tended to enhance feelings of self-determination and autonomy by engaging



**Figure 4.** The effect of year since the establishment of the protected area (PA) and participation on the proportion of (a) socially successful conservation projects in and around PAs and (b) economically successful conservation projects in and around PAs (vertical lines, binomial error bars; participation: 1, token participation or manipulation [i.e., Pretty 1995 scale]; 7, self-mobilization). The squares represent predicted probabilities of the proportion of successful projects from the model for the logistic regression; the other significant independent variable (i.e., the proportion of intrinsic instruments) was set to mean values.

the community in how payments would be provided and who would receive them and by investing in building long-term relationships with the community (Souto et al. 2014). The impacts of economic incentives on intrinsic motivation are complex and can depend on numerous contextual factors (Rode et al. 2015) such as the size or timing of the financial incentive (Gneezy & Rustichini 2000), whether the incentives are contingent on monitoring (Deci et al. 1999; Festré & Garrouste 2014), whether payments are made to a group or an individual (Narloch et al. 2012), and prevailing cultural beliefs (Bowles 2008). More research is needed to understand how monetary incentives can influence feelings of self-determination.

The direction of causality between intrinsic motivation and project success could be reversed and project success may have instead fostered the conditions for intrinsic motivation (e.g., social capital and relatedness). If indeed enhanced relatedness, autonomy, and competence are additional benefits from a conservation project, then per-

haps these types of benefits should be considered an additional type of benefit from conservation projects. Because intrinsic values tend to also foster well-being and environmentally sustainable behaviors (Kasser 2002; Sheldon et al. 2011), enhancing intrinsic values are important benefits that could be considered alongside tangible benefits such as ecosystem recovery, economic development, and social justice.

### Future Research

We assessed ecological, social, or economic success as a binary outcome. However, projects can impact different members of the community or species to varying degrees (Agrawal 2009). Moreover, a finer grain approach with an ordinal or continuous outcome variable (rather than binary) may provide a more nuanced systematic review.

We hope our results highlight the importance of understanding the complexity of the motivational landscape of a project and help spur more research investigating how conservation interventions affect feelings of autonomy, competence, and relatedness. Although researchers have examined ecological and economic outcomes (Peng et al. 2006; Bryce et al. 2011) of conservation projects, psychological research (Schwartz 2006) indicates that people are much more complex and motivated by far more than just financial or ecological gain (Langholz et al. 2000; Blackmore & Doole 2013). Hope, pride, competition, and a sense of community ownership or solidarity may all help inspire conservation action (Murphee 2009; Hazzah et al. 2014; Silva & Mosimane 2014). More research aimed at uncovering the costs and benefits of conservation in very specific cultural contexts may improve the understanding of why people engage in conservation projects and answer some of the questions that we could not give in this study.

With the rapid rate of biodiversity loss (Butchart et al. 2010), extrinsic incentives seem to be attractive and necessary short-term responses to halt immediate degradation. If, however, conservation is to be self-sustaining, quick solutions should not preclude investment by the conservation community in the long-term process of recognizing and engaging with local people's identities—their institutions, cultures, and individual preferences. Although slower and greater in scope compared with strictly ecological goals, these slower processes can allow for an intrinsic motivation that can develop into long-lasting cultures of conservation (García-Amado et al. 2013; Souto et al. 2014). Whether payments are overall positive or negative, conservationists should heed the advice of economist Samuel Bowles (2008): “Good policies and constitutions are those that support socially valued ends not only by harnessing selfish preferences to public ends but also by evoking, cultivating, and empowering public-spirited motives.”

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## Supporting Information

Details of keyword searches (Appendix S1), different types of policy instruments (Appendix S2), and coding (Appendix S3) are available online. The authors are solely responsible for the content and functionality of these materials. Queries (other than absence of the material) should be directed to the corresponding author.

## Literature Cited

- Adams WM, Aveling R, Brockington D, Dickson B, Elliot J, Hutton J, Roe D, Vira B, Wolmer W. 2004. Biodiversity conservation and the eradication of poverty. *Science* **306**:1146–1149.
- Agrawal A, Gibson CC. 2001. *Communities and the environment*. Rutgers University Press, Piscataway, New Jersey.
- Agrawal B. 2009. Gender and forest conservation: the impact of women's participation in community forest governance. *Ecological Economics* **68**:2785–2799.
- Andrade GSM, Rhodes JR. 2012. Protected areas and local communities: An inevitable partnership toward successful conservation strategies? *Ecology and Society* **17**:14–23.
- Balint PJ, Mashinya J. 2006. The decline of a model community-based conservation project: governance, capacity, and devolution in Mahenye, Zimbabwe. *Geoforum* **37**:805–815.
- Barrett CB, Brandon K, Gibson C, Gjertsen H. 2001. Conserving tropical biodiversity amid weak institutions. *BioScience* **51**:497–502.
- Berkes F. 2009. Evolution of co-management: role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management* **90**:1692–1702.
- Blackmore L, Doole GJ. 2013. Drivers of landholder participation in tender programs for Australian biodiversity conservation. *Environmental Science and Policy* **33**:143–153.
- Bowles S. 2008. Policies designed for self-interested citizens may undermine “the moral sentiments”: evidence from economic experiments. *Science* **320**:1605–1609.
- Brockington D, Wilkie D. 2015. Protected areas and poverty. *Philosophical Transactions of the Royal Society B* **370**:20140271. Available from <http://rstb.royalsocietypublishing.org/content/royptb/370/1681.toc.pdf>.
- Brooks JS, Waylen KA, Mulder MB. 2012. How national context, project design and local community characteristics influence success in community-based conservation project. *Proceedings of the National Academy of Science of the United States of America* **109**:21265–21270.
- Brosius P, Tsing AL, Zerner C, Alcorn J. 2005. *Communities and conservation: histories and politics of community-based natural resource management*. AltaMira Press, Santa Cruz, California.
- Bryce R, Oliver MK, Davies L, Gray H, Urquhart J, Lambin X. 2011. Turning back the tide of American mink invasion at an unprecedented scale through community participation and adaptive management. *Biological Conservation* **144**:575–583.
- Butchart SHM, et al. 2010. Global biodiversity: indicators of recent declines. *Science* **328**:1164–1168.
- Castrejón M, Charles A. 2013. Improving fisheries co-management through ecosystem-based spatial management: the Galapagos Marine Reserve. *Marine Policy* **38**:235–245.
- Cinner J, Huchery C. 2014. A comparison of social outcomes associated with different fisheries co-management institutions. *Conservation Letters* **7**:224–232.
- Clifton J. 2013. Refocusing conservation through a cultural lens: improving governance in the Wakatobi National Park, Indonesia. *Marine Policy* **41**:80–86.
- Cowling R. 2014. Let's get serious about human behavior and conservation. *Conservation Letters* **7**:147–148.
- Cudney-Bueno R, Bourillón L, Sáenz-Arroyo A, Torre-Cosío J, Turk-Boyer P, Shaw WW. 2009. Governance and effects of marine reserves in the Gulf of California, Mexico. *Ocean & Coastal Management* **52**:207–218.
- Danielsen F, Burgess ND, Balmford A. 2005. Monitoring matters: examining the potential of locally-based approaches. *Biodiversity & Conservation* **14**:2507–2542.
- DeCaro D, Stokes M. 2008. Social-psychological principles of community-based conservation and conservancy motivation: attaining goals within an autonomy-supportive environment. *Conservation Biology* **22**:1443–1451.
- Deci EL, Koestner R, Ryan RM. 1999. A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin* **125**:627–688.
- Dressler W, Roth R. 2011. The good, the bad, and the contradictory: neoliberal conservation governance in rural Southeast Asia. *World Development* **39**:851–862.
- Ferraro PJ, Kiss A. 2002. Direct payments to conserve biodiversity. *Science* **298**:1718–1719.
- Festré A, Garrouste P. 2014. Theory and evidence in psychology and economics about motivation crowding out: A possible convergence? *Journal of Economic Surveys* **29**:339–356.
- Gandiwa E, Heitkonig IMA, Lokhorst AM, Prins HHT, Leeuwis C. 2013. Illegal hunting and law enforcement during a period of economic decline in Zimbabwe: A case study of northern Gonarezhou National Park and adjacent areas. *Journal for Nature Conservation* **21**:133–142.
- García-Amado LR, Pérez MR, García SB. 2013. Motivation for conservation: assessing integrated conservation and development projects and payments for environmental services in La Sepultura Biosphere Reserve, Chiapas, Mexico. *Ecological Economics* **89**:92–100.
- Glaser M, Baitoningsih W, Ferse SCA, Neil M, Deswandi R. 2010. Whose sustainability? Top-down participation and emergent rules in marine protected area management in Indonesia. *Marine Policy* **34**:1215–1225.
- Gneezy U, Rustichini A. 2000. Pay enough or don't pay at all. *Quarterly Journal of Economics* **115**:791–810.
- Grouzet FME, Kasser T, Ahuvia A, Fernandez-Dols JM, Kim Y, Lau S, Ryan RM, Saunders S, Schmuck P, Sheldon KM. 2005. The structure of goal contents across 15 cultures. *Journal of Personality and Social Psychology* **89**:800–816.
- Gutiérrez NL, Hilborn R, Defeo O. 2011. Leadership, social capital and incentives promote successful fisheries. *Nature* **470**:386–389.
- Hazzah L, Dolrenry S, Naughton L, Edwards CT, Mwebi O, Kearney F, Frank L. 2014. Efficacy of two lion conservation programs in Maasailand, Kenya. *Conservation Biology* **28**:851–860.

- Hilborn R, Arcese P, Borner M, Hando J, Hopcraft G, Loibooki M, Mduma S, Sinclair ARE. 2006. Effective enforcement in a conservation area. *Science* **314**:1266.
- Hind EJ, Hiponia MC, Gray TS. 2010. From community-based to centralised national management—a wrong turning for the governance of the marine protected area in Apo Island, Philippines? *Marine Policy* **34**:54–62.
- Igoe J, Brockington D. 2007. Neoliberal conservation: a brief introduction. *Conservation and Society* **5**:432–449.
- IUCN (International Union for Conservation of Nature). 2015. Protected Areas Categories. Available from <https://www.iucn.org/theme/protected-areas/about/protected-areas-categories> (accessed June 1, 2015).
- Karki ST. 2013. Do protected areas and conservation incentives contribute to sustainable livelihoods? A case study of Bardia National Park, Nepal. *Journal of Environmental Management* **128**:988–999.
- Kasser T. 2002. *The high price of materialism*. MIT Press, Massachusetts.
- Kollmuss A, Agyeman J. 2002. Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behaviour? *Environmental Education Research* **8**:239–260.
- Langholz J, Lassoie J, Schelhas J. 2000. Incentives for biological conservation: Costa Rica's private wildlife refuge program. *Conservation Biology* **14**:1735–1743.
- Laurance WF. 2006. The perils of payoff: corruption as a threat to global biodiversity. *Trends in Ecology & Evolution* **19**:399–401.
- Lu D-J, Chou Y-F, Yuan H-W. 2005. Paradigm shift in the institutional arrangement of protected areas management in Taiwan—a case study of Wu-Wei-Kang Waterfowl Wildlife Refuge in Ilan, Taiwan. *Environmental Science & Policy* **8**:418–430.
- Martin A, Gross-Camp N, Kebede B, McGuire S, Munyarukaza J. 2014. Whose environmental justice? Exploring local and global perspectives in a payment for ecosystem services scheme in Rwanda. *Geoforum* **54**:167–177.
- Mbaiwa JE, Stronza AL. 2011. Changes in resident attitudes towards tourism development and conservation in the Okavango Delta, Botswana. *Journal of Environmental Management* **92**:1950–1959.
- Mena CF, Barbieri AF, Walsh SJ, Erlie CM, Holt FL, Bilsborrow RE. 2006. Pressure on the Cuyabeno Wildlife Reserve: development and land use/cover change in the Northern Ecuadorian Amazon. *World Development* **34**:1831–1849.
- Murphee MW. 2009. The strategic pillars of communal natural resource management: benefit, empowerment and conservation. *Biodiversity and Conservation* **18**:2551–2562.
- Narloch U, Pascual U, Drucker AG. 2012. Collective action dynamics under external rewards: experimental insights from Andean farming communities. *World Development* **40**:2096–2107.
- Ostrom E. 1990. *Governing the commons: the evolution of institutions for collective action*. Cambridge University Press, Cambridge, United Kingdom.
- Peng B, Hong H, Xue X, Jin D. 2006. On the measurement of socio-economic benefits of integrated coastal management (ICM): applications to Xiamen. *Ocean and Coastal Management* **49**:93–109.
- Pohl C, et al. 2010. Researchers' roles in knowledge co-production: experience from sustainability research in Kenya, Switzerland, Bolivia and Nepal. *Science of Public Policy* **17**:267–281.
- Pollnac RB, Poggie JJ. 2008. Happiness, well-being and psychocultural adaptation to the stresses associated with marine fishing. *Human Ecology Review* **15**:194–200.
- Pretty J. 1995. Participatory learning for sustainable agriculture. *World Development* **23**:1247–1263.
- Pullin AS, Stewart GB. 2006. Guidelines for systematic review in conservation and environmental management. *Conservation Biology* **20**:1647–1656.
- Rode J, Gomez-Baggethun E, Krause T. 2015. Motivation crowding by economic incentives in conservation policy: a review of empirical evidence. *Ecological Economics* **117**:270–282.
- Ryan RM, Deci EL. 2000. Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychologist* **55**:68–78.
- Salafsky N, Margoluis R. 2004. Using adaptive management to improve ICDPs. Pages 372–394. in McShane TO, Wells MP, editors. *Getting biodiversity projects to work: towards more effective conservation and development*. Columbia University Press, New York.
- Schwartz SH. 2006. Value orientations: measurement, antecedents and consequences across nations. Pages 169–203 in Jowell R, Roberts C, Fitzgerald R, Eva G, editors. *Measuring attitudes cross-nationally—lessons from the European Social Survey*. Sage, London.
- Sheldon KM, Nichols CP, Kasser T. 2011. Americans recommend smaller ecological footprints when reminded of intrinsic American values of self-expression, family, and generosity. *Ecopsychology* **3**:97–104.
- Silva JA, Mosimane A. 2014. “How could I live here and not be a member?”: Economic versus social drivers of participation in Namibian Conservation Programs. *Human Ecology* **42**:183–197.
- Skinner BF. 1976. *About behaviouralism*. Vintage, Toronto.
- Sommerville M, Milner-Gulland EJ, Rahajaharison M, Jones JP. 2010. Impact of a community-based payment for environmental services intervention on forest use in Menabe, Madagascar. *Conservation Biology* **24**:1488–1498.
- Souto T, Deichmann JL, Nunez C, Alonso A. 2014. Classifying conservation targets based on the origin of motivation: implications over the success of community-based conservation projects. *Biodiversity and Conservation* **23**:1331–1337.
- St John FAV, Edwards-Jones GA, Jones JPG. 2010. Conservation and human behaviour: lessons from social psychology. *Wildlife Research* **37**:658–667.
- Struhsaker TT, Struhsaker PJ, Siex KS. 2005. Conserving Africa's rain forests: problems in protected areas and possible solutions. *Biological Conservation* **123**:45–54.
- The World Bank. 2013. World development indicators. The World Bank, Washington, D.C. Available from <http://data.worldbank.org/data-catalog/world-development-indicators> (accessed July 2015).
- Torell E, Crawford B, Kotowicz D, Herrera MD, Tobey J. 2010. Moderating our expectations on livelihoods in ICM: experiences from Thailand, Nicaragua, and Tanzania. *Coastal Management* **38**:216–237.
- UNDP (United Nations Development Programme). 2001. *Human Development Report 2014, Sustaining human progress: reducing vulnerabilities and building resilience*. United Nations Human Development Programme, New York. Available from <http://hdr.undp.org/sites/default/files/hdr14-report-en-1.pdf>.
- Waylen KA, Fischer A, McGowan PJK, Thirgood SJ, Milner-Gulland EJ. 2010. Effect of local cultural context on the success of community-based conservation interventions. *Conservation Biology* **24**:1119–1129.
- West P, Igoe J, Brockington D. 2006. Parks and people: the social impact of protected areas. *Annual Review of Anthropology* **35**:557–567.
- Wise SP. 2014. Learning through experience: non-implementation and the challenges of protected area conservation in The Bahamas. *Marine Policy* **46**:111–118.
- Wunder S. 2013. When payments for environmental services will work for conservation. *Conservation Letters* **6**:230–237.
- Young EH. 2001. State intervention and abuse of the commons: fisheries development in Baja California Sur, Mexico. *Annals of the Association of American Geographers* **91**:283–306.
- Zuur AF, Ieno EN, Walker NJ, Saveliev AA, Smith GM. 2009. *Mixed effects models and extensions in ecology with R*. Springer, New York.