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THE EFFECT OF LOCAL CULTURAL CONTEXT ON COMMUNITY-BASED CONSERVATION INTERVENTIONS: EVALUATING ECOLOGICAL, ECONOMIC, ATTITUDINAL AND BEHAVIOURAL OUTCOMES

Systematic Review

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Systematic Review Summary

Background

Conservation interventions require evaluation to understand what factors predict success or failure. To date there has been little systematic investigation of the effect of social and cultural context on conservation success, although a large body of literature argues it should be important. Only one previous systematic review has studied determinants of conservation success, focusing on the use of development as a conservation tool. Here we investigate the role of local cultural context on conservation outcomes, using four measures of success: ecological, economic, attitudinal and behavioural.

Objective

The objective is to assess the role of local cultural context, particularly local institutions, and the efforts of interventions to engage with this, on the outcomes of community-based conservation projects. We also tested the effects of community participation, conservation education, benefit provision and market integration. We used five hypotheses. Success in CBC interventions is predicted by: (1) a supportive local cultural context, (2) project engagement with local cultural context, (3) high levels of local participation, (4) conservation education, (5) market integration and benefit provision by projects.

Study inclusion criteria

Studies were included if they met the following criteria:

- Type of study – primary literature
- Subject studied – any community-based conservation project with specific conservation goals to be achieved with some attention or inclusion of local people.
- Outcomes – four different measures of success were sought (ecological, economic, attitudinal, and behavioural). At least two of the outcomes had to be measured for inclusion in the study.
- Quality of evidence – no more than 25% missing information about predictors.

Scope of the search

We conducted web-based searches for peer-reviewed publications in ISI Web of Knowledge, Anthropology Plus and JSTOR electronic databases. In addition we searched Google Scholar, and accepted any relevant academic theses and NGO reports. We searched for the terms *community based conservation, integrated conservation and development, ICDP, CBC and community conservation*.

Main results

Our results supported our main interest, as the first two hypotheses were supported. Supportive local cultural context influenced intervention outcomes, whilst interventions that engaged with local institutions were also more likely to succeed. However, there

was limited support for the role of community participation, conservation education, benefit provision and market integration on intervention success.

Conclusions

Cultural context appears to be a key factor shaping the outcomes of community-based conservation interventions. We therefore recommend that conservation interventions should understand the societies they work with and tailor their activities accordingly. We also note that the quantity and quality of conservation reporting should be improved, to allow evaluation of conservation evidence.

1. BACKGROUND

Since the 1980s, conservation efforts in developing countries have generally tried to incorporate the interests and views of local people (Western et al. 1994). These community-based conservation (CBC) interventions take a variety of forms, from those emphasizing community outreach, through to integrated conservation and development projects (ICDPs), where development takes equal precedence with conservation (Adams & Hulme 2001).

Despite the popularity of CBC approaches, outcomes have been mixed (Kellert et al. 2000). The literature contains a variety of suggestions for improving the practice of CBC (e.g. Adams & Hulme 2001; McShane & Wells 2004). One common view is that local cultural context has considerable influence on conservation outcomes, and so interventions should pay greater attention to understanding and adapting to this (e.g. Brechin et al. 2002; Peterson et al. 2009). However, it is important to test this argument as there are many other competing suggestions for how to improve CBC practice, from focusing on market integration to providing education. Systematic reviews of evidence are recommended as a robust and objective approach to informing policy and practice (Roberts et al. 2006; Centre for Evidence-Based Conservation 2008).

Our study provides the first systematic review of the importance of local cultural context for the outcomes of conservation interventions. Definitions of culture, society and its constituent parts are complex, multiple and contested (Jenkins 2002). Since this topic often receives little attention in many conservation publications, we use a simple definition of local culture as the shared values and institutions of particular group of people. In this study we particularly focused on local institutions, that is, formal and informal rules that act as incentives and constraints on behavior (similar to the definition of North 1991). We consider institutions as part of the culture of a place: local institutions represent and shape local culture, and thus a worthwhile avenue for understanding cultural influences, which are otherwise difficult to capture and to operationalize.

To maximize our ability to detect effects on outcomes we used four distinct measures of intervention success. We believe the ultimate measure of success for a conservation intervention must be progress towards species or habitat conservation goals, the ecological outcome. However, the CBC rationale argues that conservation success is supported by positive attitudes to conservation interventions (perhaps caused by the receipt of financial benefits), and in turn by pro-conservation behaviors of the local community. We therefore also recorded attitudinal, behavioral and economic outcomes. Although we did not expect any one outcome type to be a complete proxy for another, success in one aspect may be a useful indicator of unreported outcome types. Furthermore, use of four outcome types facilitates comparison with other work.

2. HYPOTHESES

The hypotheses tested by our systematic review are that success in CBC interventions is predicted by: (1) a supportive local cultural context, (2) project engagement with local cultural context, (3) high levels of local participation, (4) conservation education, (5) market integration and benefit provision by projects. We also aimed to assess the quality and quantity of conservation evidence for our search.

3. METHODS

3.1. Question formulation

The impetus for this project originated from the discourse critiquing current practices in conservation, particularly community-based conservation (CBC) approaches. Many have suggested that insufficient attention and engagement with ‘community’ has been responsible for conservation failures, and we wished to test this particular argument. Our starting point was therefore an interest in culture and CBC projects. We were also influenced by the approach and methods of a previous systematic review into Integrated Conservation and Development Projects (ICDPs) a subset of CBC approaches (Brooks et al. 2005).

We expected that many aspects of local culture could influence conservation outcomes. However, in this study we decided to focus particularly on the aspect of local institutions, because other aspects of culture were rarely reported on. However, since local institutions are part of the culture of a place: both shaping it and representing it, they offer a useful insight into cultural influences. In many cultures, non-governmental institutions that reflect shared values (such as taboos, community pride, traditions and codes of conduct) affect resource use and hence conservation (e.g. Alpert 1996; Jones et al. 2008). For example, sacred groves can protect patches of habitat (Bhagwat & Rutte 2006), whilst local hunting traditions can drive unsustainable resource use (Robinson & Bennett 2000). As important are governmental institutions, even those not directly concerned with resource management, as there is growing consensus that corruption and ineffective governmental institutions underlie many failures in conservation (Smith et al. 2003). We therefore expected that a supportive cultural context, specifically supportive local institutions, would improve the likelihood of success in conservation interventions.

An understanding and engagement with local institutions – be it working with community councils or respecting local spiritual guidance on headquarter location – can greatly support an intervention. The opposite effect is true for interventions which conflict with local culture (e.g. Gill 1994). As well as adapting to existing local institutions, attempts to create or improve institutions are likely to be helpful, as they improve local capacity for equitable management and adaptation (e.g. Botha et al. 2007). Some case studies show that failure can result when interventions make little attempt at local engagement, or even promote socially unacceptable activities (e.g. Klein et al. 2007). Therefore, we expected an intervention’s positive engagement with local cultural context to improve the likelihood of its success.

Closely related to these expectations is the argument that local participation promotes the success of conservation interventions. Many sources have suggested that community participation promotes conservation success (e.g. Campbell & Vainio-Mattila 2003), and this is a key part of the rationale for CBC (Western et al. 1994). There are multiple practical reasons, as well as moral arguments, why participation is desirable. For example, local involvement can allow the incorporation of local knowledge and entails greater interest in and ownership over the resource in question, and so greater concern for its conservation. To date, some reviews of conservation interventions have supported this argument (e.g. Gratwicke et al. 2007) whilst others found no clear effect (e.g. Brooks et al. 2005). Therefore, we expected that greater community participation will increase the likelihood of intervention success. Furthermore, as knowledge is needed to understand the purpose of interventions, and so produce local enthusiasm and involvement in conservation (Jacobson et al. 2006), we also expected that interventions providing conservation education would be more likely to succeed.

Many suggest that provision of local economic benefits will act as an incentive for pro-conservation behaviors (e.g. Larson et al. 1998), and the previous systematic review of ICDPs found that project success is indeed associated with good market links and greater provision of benefits and use of natural resources (Brooks et al. 2006). As ICDPs are a subset of CBC interventions, we expected to find a similar effect in this study. Our fifth and final hypothesis is that market links and local benefit provision will improve the likelihood of intervention success.

3.2. Search strategy

The case studies which formed our dataset were systematically selected from the literature on conservation interventions. Until January 2008, searches of the web-based databases ISI Web of Knowledge, Anthropology Plus and JSTOR were made using the search terms community based conservation, integrated conservation and development, ICDP, CBC and community conservation. As much 'grey' literature in conservation is of high quality and could be valuable for evaluating and understanding conservation success (e.g. Adams et al. 2002), we also screened the first 500 returns from the Google Scholar search engine. Only English language publications were assessed.

3.3. Study inclusion criteria

Studies were accepted if they met four criteria: (1) source quality, (2) subject, (3) outcome measurement, (4) quality of predictor measurement.

First, the study had to be sourced in the primary literature, not in reviews or other secondary evidence. Where more than one acceptable source referred to the same intervention, the most recent source was used but the older source supplied any missing information about predictors. Second, the subject of the study had to be a CBC intervention. This term was broadly interpreted, to encompass both wildlife and area-based conservation (as in Jones 2007). However, we did not include interventions designed without conservation goals, such as ecotourism operations set up without explicit conservation aims (e.g. Wunder 2000). Third, at least two of the four outcome

types had to be measured. Finally, no more than 25% missing information about predictors was acceptable.

3.4. Study quality assessment

Every article returned by the databases had its full text viewed if the title and abstract indicated it might meet the study inclusion criteria. About 320 sources appeared acceptable but 15 could not be viewed due to copyright restrictions. Some sources contained information on more than one intervention: we accepted each of these if they met the inclusion criteria. We reviewed about 270 sources and our final sample size was 68 case studies from 69 sources. Ten sources in the final sample were not peer-reviewed journal articles.

3.5. Data extraction

K.A.W. developed the coding protocol, taking as a starting point the protocol used by Brooks et al. (2005) and tested on studies that did not qualify for inclusion. Where possible, coding of variables matched that of Brooks, for comparability. Although authors may not always be objective in their evaluations, bias cannot be reliably known to the reader, so coding was based on the judgment of the source paper, not our own views. For example, one source might report long term sustainability of livelihoods as economic success, whereas another might report limited short term financial benefits as success; however both would be given a score of ‘successful’.

Two researchers (KAW and a student M.Rack) coded the same twenty-five studies separately, and we assessed their inter-coder reliability by calculating Cohen’s Kappa with the ‘irr’ package (Gamer et al. 2008) in R version 2.6.0 (R Development Core Team 2007). We used Cohen’s Kappa to represent the proportion of agreement after accounting for the level of agreement expected by chance when coding categorical data (Cohen 1960), and Cohen’s weighted Kappa for ordinal data (Cohen 1968; Siegel & Castellan 1988). The first version of the coding protocol showed moderate agreement for the fifteen predictors (mean $\kappa = 0.52$) and four outcomes (mean $\kappa = 0.41$). However, a few predictors and outcomes had very poor reliability (minimum $\kappa = 0.118$). We tended to find less reliability with poorly described non-numeric variables, which required subjective interpretation by the coder, so we revised and expanded the protocol for these variables. When we could not rewrite the protocol to improve reliability, or where variables were dependent on infrequently reported data, we removed the variables from our study. For this reason, only certain aspects of culture could be coded, some of which were relatively broad (e.g. supportive local institutions). Community heterogeneity is thought to significantly impede local conservation management (Agrawal & Gibson 1999) but could only be indicated through a proxy of community homogeneity, namely community size.

3.6. Development of coding protocol

Information was extracted from the reviewed studies to create a dataset stored in excel. Both qualitative and quantitative information was used. We created many variables to

describe many aspects of a project and its context but only those directly relevant to the hypotheses are discussed here.

We created fifteen explanatory variables, describing the interventions' context and design (Tables 1 and 2). Six variables related to the first and second hypotheses: three described aspects of local cultural context (supportive institutions, human population size, land tenure) whilst three described aspects of a project's engagement with local institutions (institution building and engagement with either governmental institutions, or non-governmental institutions and shared values). Local institutions were an aspect of local culture that was frequently reported and feasible for coding. Three variables related to local participation (participation in both design and implementation of intervention, and presence of charismatic individuals), one variable represented conservation education, and five related to the extent of benefit sharing and market links. Table 3 describes the four outcome variables.

Based on the revised coding protocol, all sixty-eight studies were recoded. Due to the use of qualitative material, our measures for the variables were frequently based on the subjective assessment of the two reviewers. We ordered the categorization of all variables so that positive associations between predictors and outcomes indicated support for the hypotheses. We also coded the quality of measurement of each outcome, on a three-level ordinal scale from low to high, to check outcomes reported were not biased by the quality of the reporting. There were no associations between measurement quality and level of success recorded, so we retained all 68 case studies for analysis.

3.7. Analysis of predictor and outcomes

To analyze each two-way association between predictor and outcomes, we followed the precedent of Brooks et al. (2005). For each two-dimensional table, the degree of association was indicated by the Goodman-Kruskal gamma statistic (Goodman & Kruskal 1954). Gamma lies in the range -1, +1, and the variables were coded in such a way that a gamma closer to one indicated support for the hypotheses.

For each test statistic a p value was calculated using the Monte Carlo method, which is appropriate for small or heavily tied data sets (Agresti 2002). For each observed table, 5000 random tables were generated based on the assumption of predictor and outcome being independent but with the same row and column sums. For every random table, a gamma was generated and stored. The p value was calculated as the proportion of those 5000 random gamma statistics that were larger than or equal to the observed gamma (one sided as the hypotheses are directional).

Running multiple statistical tests raises the likelihood of accepting spurious associations as significant. Since we used 15 predictors and 4 outcome measures to generate 60 observed tables and test statistics, this was a potential problem. We controlled for the false discovery rate using the procedure of Benjamini & Hochberg (1995), generating a q value to replace each p value, using the 'qvalue' package in R, based on the algorithms of Storey (2002), as per the procedure in Brooks et al. (2005).

Table 1 Variables used as predictors of community-based conservation intervention outcomes, together with descriptions of what they represent and their coding: variables were ordered such that positive associations with outcomes indicated support for the relevant hypothesis, and where no information was available, a variable was coded as ‘NA’.

Main hypotheses and variable names	Description of variables and coding
1. Local cultural context	
supportive institutions	information on the supportiveness of non-governmental institutions (for example, a taboo on hunting a protected species) and effectiveness of governmental institutions (for example, intra-community conflicts indicate poor effectiveness); three-level ordinal variable (from unsupportive/conflicting institutions, to supportive institutions)
land tenure	control and ownership of land; four-level ordinal variable from low to high community control (1: no community control, 2: mixed community and other control, 3: local but private land ownership, 4: total communal and/or community control)
human population size	population size (used as a simple indicator of community homogeneity) targeted by the conservation intervention; seven-level ordinal variable (over 50,000, 10,000-50,000, 5,000-10,000, 1,000-5,000, 500-1,000, 200-500, under 200)
2. Intervention engagement with local cultural context	
institution building	assistance by the intervention for institution building, activities designed to create and/or improve institutions for governance or natural resource management; binary variable (no/yes)
approach to governmental institutions	approach of the intervention to local governmental institutions (local level organizations and formal social constraints, including constitutions, laws and enforcement); three-level ordinal score (from conflict to active engagement by an intervention)
approach to non-governmental institutions and shared values	approach of the intervention to local non-governmental institutions (such as traditions or religion) and shared values (such as widespread pride in a particular local feature) ; three-level ordinal score (from conflict to active engagement)

Table 2 Variables used as predictors of community-based conservation intervention outcomes, together with descriptions of what they represent and their coding: variables were ordered such that positive associations with outcomes indicated support for the relevant hypothesis, and where no information was available, a variable was coded as ‘NA’.

Secondary hypotheses and variable names	Description of variables and coding
3. <i>Community participation</i>	
establishment input*	community involvement in the intervention’s initial design and development; five-level ordinal score (from control only by outside NGO or other agency, to complete community control).
decision control*	community control of day-to-day decision making on the intervention; three-level ordinal scale (from no community, to total community control)
charisma	presence of charismatic individuals may strengthen institutions and galvanize support for conservation (Oldfield 2004); recorded as a binary variable (no/yes)
4. <i>Conservation education</i>	
education	provision of conservation education to the community by the intervention; binary variable (no/yes)
5. <i>Benefits and market integration</i>	
market threat	if the principal threat to biodiversity is linked to commercial market forces; binary score (no/yes)
market integration	market integration is based on a community’s involvement in wage labor, market sales, market purchases and distance from markets; three-level ordinal variable (from low to high market integration)
PA use*	if an intervention is associated with a protected area, the permitted resource utilization of that area is estimated by the IUCN ranking of the area (www.iucn.org/themes/wcpa/ppa/protectedareas.htm); six-level ordinal score (from no use, to unrestricted resource use)
intervention benefits *	approach of the intervention to the generation and provision of tangible benefits for the community; seven-level ordinal variable ordered as per Brooks* (from no community use, to interventions that use a variety of approaches to benefit the community).
benefit inequity	benefits generated by the intervention were inequitably distributed; binary variable (yes/no)

*Where possible, to facilitate comparison, we coded variables and ordered categories in the same way as Brooks et al. (2005). These variables are marked * and their labels correspond with Brooks: establishment input = implementation, decision control = decision, PA use = IUCN, intervention benefits = use. Further detail of their coding is in Brooks et al. (2005). IUCN is the World Conservation Union.

Table 3 Variables used as indicators of outcomes of community-based conservation interventions, together with descriptions of what they represent: assessments of failure or success were based on judgments made by each source, not by the coder, and where no information was available, a variable was coded as ‘NA’.

Outcome variable	Description of variable and coding
attitudinal	local attitudes towards the conservation intervention and conservation activities; three-level ordinal variable, ordered from failure (e.g. no changed attitudes and even creation of negative attitudes), mixed effects (e.g. some evidence of positive attitudes or changed attitudes in a few), to success (e.g. significant positive attitudes in the population).
behavioral	local behaviors of interest to conservation (either avoidance or alteration of destructive behaviors and/or adoption of new pro-conservation behaviors); three-level ordinal variable, ordered from failure (e.g. no behavioral change), mixed effect (e.g. a few or limited behavioral changes) to success (e.g. significant change of behavior and/or change in the majority of the community)
ecological	ecological outcomes of interest to conservation (either species or area-based, depending on intervention goals); three level ordinal variable, ordered from failure (e.g. decline or no improvement in ecological status), mixed effects, to success (e.g. improvement in populations of interest, or improved habitat diversity)
economic	local economic outcomes influenced by the project, including community level developmental benefits; three level ordinal variable, ordered from failure (e.g. failure to improve income of any participants, or failure to provide community-level benefits) to mixed effects, to success (e.g. significant improvement in income of majority of community)

3.8. Analysis of predictor covariance

We expected that some of the predictors would covary. For example, projects which demonstrate greater adaptation to and engagement with local culture may also have greater community involvement in decision making. Therefore, for each pair of predictors we generated a Goodman-Kruskal gamma and Monte Carlo p value. As we wished to identify all possible covariance (rather than conservatively test hypotheses) we did not replace these with q values. We also examined the structure of significant predictors with a Categorical Principal Components Analysis (catPCA) in SPSS 17.0 (SPSS 2008). The procedure reduces the dimensionality of the data into principal components (PCs), and the loading of each predictor onto each PC indicates its contribution. We retained the PCs which accounted for significant variance in the predictors by selecting those with Eigenvalues over 1. Missing observations were ignored in forming the optimal scaling of each variable, but were still used to scale other variables (Gifi 1990).

4. RESULTS

4.1. Review summary statistics

After searching, about 320 sources appeared acceptable for viewing, but 15 could not be viewed due to copyright restrictions. We did not count the number of papers that were found and rejected prior to full text viewing based on their titles or abstracts: it was many more. Of these 305 sources, 237 were rejected for not meeting one the four study inclusion criteria. Our final sample size was 68 case studies from 69 sources (where one case study was described by more than one source, the older source was used to provide any missing information not provided in the newer source). Fifty of the articles were in peer-reviewed journal publications, 1 was a thesis, 2 were conference papers, and 15 were from NGO reports or NGO serial publication. Publication dates of articles ranged from 1988 to 2007. Twelve sources reported two measures of outcome, thirty-four reported three measures of outcome and twenty-two sources reported four measures of outcome. The least frequently reported measure of outcome was ecological outcomes (N=41) despite it being the ultimate measure of conservation success. See the appendix for information about each project and the sources used.

4.2. Study characteristics

Projects came from 31 different countries and the largest single region represented was the African tropics (Figure 1). The earliest project began in 1976, and the latest in 2000: the shortest period of time between project launch and review was only 2 years, but the maximum period was 21 years, with a mean of 9.7 years. Project age has been suggested to affect outcomes, with a minimum amount of time considered essential for developing success (e.g. Baral *et al.*, 2007; Sanjayan *et al.*, 1997), but this study found no relationship between age and any of the four outcomes. The majority of projects (N=51) were associated in some way with a protected area, forty-five projects had a focus on habitat conservation, and twenty-two an approach focused on a species, or group thereof (one project could not be classified). An example of a species focus is Zhang & Wang

(2003), who described an ICDP focused on reducing farmer conflicts with elephants in China, whilst an example of habitat focus is Stocking & Perkin (1992), who described attempts to reduce disturbance and degradation of the Usambara montane forests in Tanzania. Although many projects did not define themselves as ICDPs, the majority (58) were involved in the distribution of one or more form of benefits to the community: 25 provided compensation in the form of infrastructure or cash to benefit the community, 17 provided alternative livelihoods, and 42 provided assistance in accessing markets.

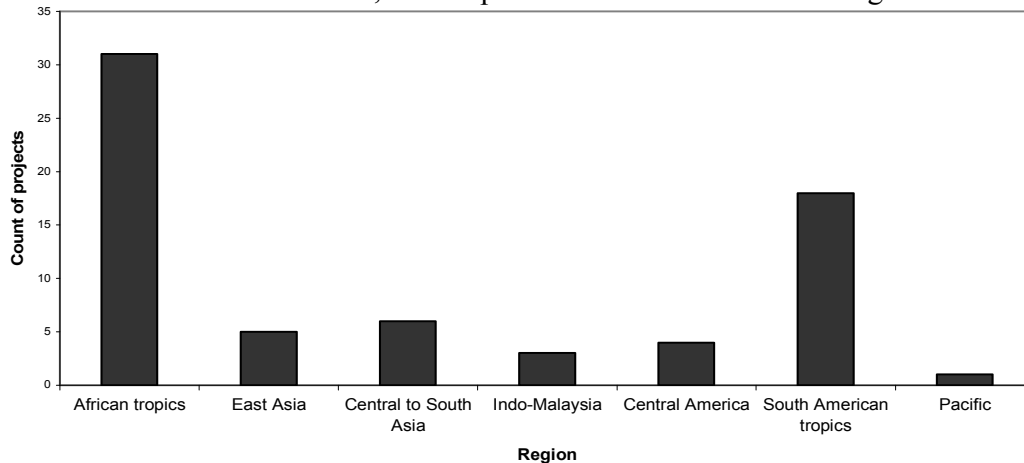


Figure 1 Geographical location of all projects included in this review.

4.3. Associations between predictors and outcomes

Although the final data set contained 68 case studies as every study contained missing information, the effective sample size for each test varied from 27 (for the association of human population size and attitudes) to 64 (for the association of several predictors with economic outcomes). Of the 60 tests generated by exploring the effect of 15 predictors on 4 outcomes, 20 were associated with q values under 0.05 and accepted as significant (Table 4). Control with q values means only one of these significant tests is expected to be a null case, compared to three had p values been used. All the significant associations were positive and so support the predictions of the hypotheses.

All outcomes were associated with an aspect of cultural context. Supportive institutions predicted successful behavioral and ecological outcomes, whilst devolved land tenure predicted successful attitudinal and economic outcomes. In contrast, human population size had no effect. There was a strong effect of predictors indicating an intervention's engagement with its cultural context. Both institution building and engagement with non-governmental institutions and shared values predicted success in all four outcome types, whilst engagement with governmental institutions predicted success in all but economic outcomes. Four other predictors were associated with outcomes. Successful attitudinal and economic outcomes were predicted by community control of day-to-day decision making (but not community involvement in the establishment of the intervention, or charismatic individuals), giving some support to the participation hypothesis. Projects delivering conservation education were positively linked with successful attitudinal outcomes. Finally, protected area use and increased market integration had positive associations with outcomes (behavior and economics), but there was no association with market integration, benefits generated by the intervention, nor benefit inequity.

Table 4 The significant associations between predictors and the four outcome types (the four columns).*

Hypothesis	Predictor	Outcome measure			
		Attitudinal	Behavioral	Ecological	Economic
Cultural context	supportive institutions	-	$\gamma=0.58$ ** n=56	$\gamma=0.55$ * n=41	-
	land tenure	$\gamma=0.53$ ** n=46	-	-	$\gamma=0.46$ * n=53
Intervention engagement with cultural context	institution building	$\gamma=0.58$ * n=52	$\gamma=0.45$ * n=56	$\gamma=0.51$ * n=41	$\gamma=0.43$ * n=65
	approach to governmental institutions	$\gamma=0.56$ ** n=59	$\gamma=0.44$ * n=56	$\gamma=0.58$ * n=41	$\gamma=0.31$ p n=54
	approach to non-governmental institutions and shared values	$\gamma=0.47$ * n=52	$\gamma=0.50$ * n=56	$\gamma=0.83$ * n=41	$\gamma=0.68$ ** n=64
Community participation	decision control	$\gamma=0.47$ ** n=51	$\gamma=0.32$ p n=55	-	$\gamma=0.50$ * n=63
Conservation education	education	$\gamma=0.39$ * n=52	-	-	-
Benefits and market integration	PA use	-	-	-	$\gamma=0.63$ ** n=50
	market threat	-	$\gamma=0.45$ * n=52	-	-

*Predictors which had no significant association with any of the outcomes are not shown. The association is measured by Goodman-Kruskal gamma statistics, gammas over zero indicate positive associations supporting the hypotheses. Asterisks indicate significant associations as measured by q values (q values replace p values to control for the false discovery rate): $q<0.05$ *, $q<0.01$ **, $q<0.001$ ***. The two tests where $p<0.05$ but $q>0.05$ are shown by the 'p' symbol, these would have been accepted if conventional p values were used.

4.4. Associations between predictors

There were 17 significant associations between the 9 significant predictor variables. The associations are conceptually plausible, for example, interventions that engaged with local governmental institutions were more likely also to show engagement with non-governmental institutions (n=68, $\gamma=0.46$, $p<0.05$). There were no strong associations (mean $\gamma=0.45$) so no predictor's effect was completely subsumed by the effect of another. The pattern of associations was confirmed by examination of the predictors using CatPCA (Table 5). All variables relating to cultural context and project engagement made a strong contribution to the first component. Although protected area use also contributed to the first component, the variables representing market-linked threats and conservation education did not. Conservation education was the sole strong contributor to the second component, whilst the third component was positively linked to market threats and protected area use, and negatively with project engagement with governmental institutions.

Table 5 Loading of each predictor onto the principal components (PCs) derived from reducing the dimensionality of the nine significant predictors with a categorical PCA (Gifi 1990), with the strength of each variable's contribution to the component is indicated by shading: light shading highlights those values with a magnitude between 0.5 and 0.64, and heavy shading those values between 0.65 and 1.

Hypothesis	Predictor	PC 1	PC 2	PC 3
Cultural context	effectiveness of local institutions	0.546	-0.256	-0.221
	tenure	0.553	-0.324	-0.161
Intervention engagement with cultural context	institution building	0.658	-0.171	-0.170
	approach to governmental institutions	0.529	0.312	-0.504
	approach to non-governmental institutions and shared values	0.504	0.453	-0.362
Participation	decision control	0.780	-0.376	0.236
Conservation education	education	0.176	0.851	-0.024
Benefits and market integration	PA use	0.610	0.011	0.573
	market threat	0.384	0.455	0.628

The variance of the predictors captured by the first 3 PCs cannot be exactly derived, but are indicated by Eigenvalues of 2.73, 1.575 and 1.268 (only PCs with Eigenvalues over 1 selected for analysis).

5. DISCUSSION

There is clear support for our first two hypotheses, that the outcomes of conservation interventions are positively affected by a supportive cultural context and engagement with the local cultural context. Our study also provides limited support for the role of local participation, conservation education, benefit provision and market integration.

5.1. Cultural context

All four measures of intervention success were affected either by the level of community tenure (attitudes and economics), or by the supportiveness of other community institutions (behavior and ecology). Through our focus on local institutions, this supports our hypothesis that a supportive cultural context significantly influences intervention outcomes. For example, effective governing institutions enable successful and equitable control of community activities and responsibilities, whilst local control of land tenure promotes individual security and concern for resources (Noss 1997). Similarly, some resources receive protection from directly supportive non-governmental institutions such as traditional beliefs and taboos (e.g. Colding & Folke 1997; Madden 2004) but when these conflict with conservation goals (for example, a traditional preference for meat) they can significantly contribute to species declines (e.g. Wiles et al. 1997).

5.2. Project engagement with cultural context

All measures of intervention success were affected by two or three of the variables indicating whether an intervention had engaged with local society. This is strong support for our hypothesis that conservation interventions are more successful if they understand and respond to local institutions and culture. Interventions which ignore traditional values and beliefs are less likely to succeed (Stevens 1997), but some interventions in this study showed good cultural sensitivity. For example, in Guyana, *Arapaima gigas* fish are the subject of many beliefs, folklore and taboos in traditional Makushi culture. Although taboos had become ignored, a partnership of local communities and national NGOs succeeded in influencing social norms so that informal social pressure made it unacceptable to overfish (Fernandes 2006).

However, there were many other interventions where cultural sensitivity was not evident, or there was even direct conflict with the local community. For example, a management plan for Ambohitany Special Reserve in Madagascar made no mention of traditional village-level institutions. The NGO involved unwittingly suggested cooperation that cut across traditional frameworks for reciprocal work, conflicted with local land tenure and inflamed existing disputes (Klein et al. 2007). Regrettably, there is no 'one size fits all' response to ensure that future interventions can better understand and adapt to society's institutions and cultures. However, it is very likely that participation will help. Commentators agree that inadequate engagement with the perspectives and values of indigenous people (Sharpe 1998) can produce interventions that are alien or incomprehensible to local people (Pujadas & Castillo 2007).

Institution building should be ideally based in a society's existing rules and organizations (Ostrom 1990). However, this is neither easy to do, nor an assurance of what we would

would regard as equitable outcomes; for example, many traditional societies marginalize women (e.g. Watts 2008). Literature from the fields of common property and development suggests that shaping equitable and effective institutions at the community level may take about a decade (Berkes 2004).

5.3. Participation and education

Our results give some support to the hypothesis that greater community participation is associated with intervention success. Although devolving intervention design was not associated with success, community control of decision making during implementation influenced both attitudinal and economic outcomes. Furthermore, there were several associations between variables for participation and engagement with local culture. This provides some support for the claims in literature (e.g. Western et al. 1994), the systematic reviews of related topics (e.g. Salafsky et al. 2001; Brooks et al. 2005), and more qualitative reviews (e.g. Sanjayan et al. 1997; Newmark & Hough 2000). Unfortunately, participation often falls short of the ideal, both in planning (Goldman 2003) and implementation (e.g. Musumali et al. 2007), so efforts should continue to facilitate community participation in conservation.

However, it is important to note that participation is not a ‘silver bullet’, whereby utopia is assured if communities have complete control (Adams & Hulme 2001). For example, a participatory decentralized forest management intervention in Tanzania gave good ecological outcomes but inequitable social outcomes, as resources and power were controlled by local elites (Friis 2008). Many interventions have fared worse. Generally, the distribution of authority across multiple institutions and levels may often be appropriate (Barrett et al. 2001) but exactly when and how it is appropriate to devolve power will depend on the effectiveness of existing institutions (Borgerhoff Mulder & Coppolillo 2005). Furthermore, participation did not predict behavioral and ecological outcomes, which are arguably the ultimate goal of conservation interventions.

We found some support for our last hypothesis, as interventions providing community outreach and education about conservation were more likely to successfully change attitudes than those that did not. This supports the argument that information is necessary for people to become concerned about nature (Jacobson et al. 2006). However conservation education had no effect on the other three measures of intervention success. This suggests interventions must address other drivers and constraints on behaviors before local participation and education can become linked with the ultimate measures of conservation success.

5.4. Benefits and market integration

We found success was not predicted by interventions that had made greater efforts to provide communities with economic and practical benefits, nor equitable delivery of benefits. However, interventions associated with protected areas that allowed community use tended to do better than those that did not. This supports the idea that giving people use and control over natural resources encourages their concern for conservation of those resources. Similarly, we did not find that market integration predicted any outcomes, but

we did find that an intervention where threat was in some way linked to commercial markets was more likely to generate pro-conservation behaviors. Resource users driven by commercial forces may have greater ability to switch behaviors than users driven by subsistence needs. Our mixed findings do not provide strong support for the hypothesis that benefit provision and market access can be important determinants of intervention success. This contrasts with previous reviews which supported the role of market access and benefit provision (Salafsky et al. 2001; Brooks et al. 2005). In contrast to these studies, our study encompassed interventions that did not have strong development objectives: the implication may be that interventions asserting development goals must deliver practical benefits in order to motivate conservation support, whilst benefit delivery is less critical to interventions that do not emphasize development objectives. Mixed support for this hypothesis may also reflect that commercialization, market access and access to technology can also lessen the sustainability of resource exploitation, depending on the context.

5.5. Relationships between outcomes

Our study was not designed to investigate the relationship between different aspects of intervention success. However, we found a different (though similar) pattern of predictors for each aspect of success. For example, permitted use of a protected area did not affect attitudes but it did predict economic outcomes. Time may change this pattern of outcomes (for example, it may take time for positive attitudes to translate into behaviors). However, different influences and constraints operate on each outcome type. For example, it is well known that attitudes may not simply correspond with behaviors (e.g. Holmes 2003; Waylen et al. 2009). Therefore, studies that report only on one aspect of success cannot assume it translates into other aspects of success. Measurement of outcomes must be carefully planned and justified (Kapos 2009).

5.6. Review limitations

Systematic reviews provide a useful approach to evaluating conservation evidence to inform and improve debates in the conservation literature. Reviews based upon larger sample sizes will be able to offer firmer conclusions and probe more complex topics. In addition, it would be useful to study many other topics, such as the effect of external shocks or political instability (e.g. Glew & Hudson 2007).

However, all reviews are limited by their original sources, and our sample size is small, though large compared to similar studies (e.g. Brooks et al. 2005). We concur with the many calls for more monitoring and reporting in conservation (e.g. Saterson et al. 2004; Sutherland et al. 2004). The reporting must also be of higher quality, for some of the papers we viewed omitted to describe even basic details, such as project's start-date. Poor quality data limit variables that can be coded – for example, human population size is not an ideal indicator of social heterogeneity. Every paper presents a version of reality constructed to convince a reader, and there is probably a general tendency to under report failure (Knight 2006). These problems can be tackled by careful planning so that monitoring is an integral part of implementation, and so that the data reported are relevant, objective and quantified where possible (Nichols & Williams 2006).

However, even if conservation evidence is provided in greater quality and quantity, systematic reviews may be well complemented by traditional reviews. There are two related reasons for this. Firstly, certain types of data that require subjective interpretation are problematic to code for a systematic review. Even if a protocol can be revised repeatedly, individual coding decisions may still differ. Secondly, chains of causality between relevant variables are likely to be multiple and complex. At this time the conservation literature does not permit the creation of the large datasets needed to build the complex statistical models required to analyze these interactions quantitatively, though Bayesian methods may help (Ellison 1996). In such situations, the strengths of traditional reviews (Baumeister & Leary 1997) – which can incorporate expert knowledge, exploit the richness of narrative content and untangle complex patterns of causality – make them powerful complements to systematic approaches.

6. CONCLUSION

6.1. Implications for management and policy

Our study provides clear support for the arguments that conservation (and hence conservationists) needs a better understanding of and adjustment to the ‘community’ in community-based conservation (e.g. Spiteri & Nepal 2006). We found more evidence to support this than to support the argument that success depends on economic benefits or market links. This is an important and controversial finding that requires further investigation. This is especially true given that our dataset of 68 case studies, whilst a great improvement on the 28 studies found by the last systematic review related to this subject (Brooks et al. 2005) is still not large by the standards of other disciplines. With small samples, even a few studies can have a large effect of findings and conclusions drawn. We therefore reiterate the calls for better monitoring and evaluation schemes of conservation interventions.

Given these caveats, we do believe that our conclusions have value, and suggest that conservationists need to prioritise understanding and engaging with the communities they work with. It will not be not easy to promote understanding and appreciation of local culture, although local participation is likely to be a mutually supportive activity. However it is necessary to try, as so far the reluctance to view conservation as a social and political process has led to many failures (Brechin et al. 2002).

6.2. Implications for Research

We have found the systematic review a useful method for studying local culture and conservation outcomes, and so we believe the method can be usefully applied to other related subjects. Many subjects within this review could usefully receive more attention, such as the definition of outcomes, or other aspects of cultural context. In particular, one subject which hitherto not been touched is the role of broader socio-political context on conservation outcomes. There is growing concern for the role of ineffective governmental institutions (e.g. Smith and Walpole, 2005). As some anecdotal evidence would seem to support these concerns, it would be valuable to see a review which used a

similar search procedure but to record associations between CBC projects outcomes and their broader context. The subject of local participation in projects also requires direct attention: elements of it were measured and found to have some association with outcomes. Given this, and the importance of this topic in arguments about how conservation should be done, a systematic review is needed, to focus explicitly on how local participation affects the success of community-based conservation projects.

However, we also believe that there is need for more primary information to increase the evidence base for systematic reviews. This review was based on only 69 projects and this is not large, although it is an improvement on the only previous comparable review, which found 28 projects (Brooks et al., 2005). A larger sample size would not only increase the power of analyses but would permit more sophisticated multivariate techniques to take account of multiple potential covarying predictors. The quality of the information reported must also be improved, for many reports viewed in the course of making this review, omitted to mention even basic aspects of project design or outcomes.

Both the problems of quality and quantity of information may be solved by improving monitoring of existing conservation projects. In particular the quality of outcome monitoring must be improved, taking care to consistently collect and report all key aspects of a project's design and context (e.g. Kapos et al. 2008) and studying actual outcomes rather than implementation (Kapos et al., 2009). As a result, we hope that a future application of this study's protocol would produce a much larger dataset. This would not only allow retesting of the associations found by this study, but would indicate improved reporting of monitoring by conservation practitioners and researchers.

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Appendix: Case studies and source articles used in the systematic review.

The sources of the 68 projects used in the systematic review. Level of measurement of project outcomes shown (implied (poor), qualitative or quantitative) together with the success of the outcome (fail, mixed (limited success), or success). NA=not measured. Symbols for project outcome types: A=attitudinal, B=behavioural, EI=ecological, En=Economic.

Citation of source article (and secondary article, if any)	Project Name & Country	Project outcomes
Abbot, J. I. O., Thomas, D. H. L., Gardner, A. A., Neba, S. E. and Khen, M. W. (2001). Understanding the links between conservation and development in the bamenda highlands, Cameroon, <i>World Development</i> , 29 (7): 1115-1136.	Kilum-Ijim Forest Project, Cameroon	A: Quantitative Mixed B: Quantitative Mixed EI: Qualitative Success En: Implied Success
Thomas, D. H. L., Anders, S. and Penn, N. J. (2000). Conservation in the community: the Kilum-Ijim Forest Project, Cameroon, <i>Ostrich</i> , 71 (1-2): 157-161.		
Abbott, A. (2001). Evaluation of an Integrated Conservation and Development Program in Vilcabamba, Ecuador. In <i>XXIII International Congress of the Latin American Studies Association</i> , Washington, D.C., USA.	Asociacion De Productores Autonomos De Frejol Para Semilla (APAFS), Ecuador	A: NA NA B: Implied Mixed EI: Quantitative Fail En: Quantitative Success
Alcorn, J. B., Kajuni, A. and Winterbottom, B. (2002). <i>Assessment of CBNRM Best Practices in Tanzania</i> , USAID/Tanzania, Tanzania.	Cullman-Hart Project, Tanzania	A: NA NA B: Poor Success EI: NA NA En: Qualitative Success
Alcorn, J. B., Kajuni, A. and Winterbottom, B. (2002). <i>Assessment of CBNRM Best Practices in Tanzania</i> , USAID/Tanzania, Tanzania.	Ngarambe Natural Resource Management, Tanzania	A: Implied Success B: Qualitative Success EI: Implied Success En: Qualitative Success
Alcorn, J. B., Kajuni, A. and Winterbottom, B. (2002). <i>Assessment of CBNRM Best Practices in Tanzania</i> , USAID/Tanzania, Tanzania.	Robanda Community Private Tour Operator Partnership, Tanzania	A: Implied Success B: Implied Success EI: NA NA En: Qualitative Success

Alcorn, J. B., Kajuni, A. and Winterbottom, B. (2002). <i>Assessment of CBNRM Best Practices in Tanzania</i> , USAID/Tanzania, Tanzania.	Selous Conservation Programme (JUKUMU), Tanzania	A: B: El: En:	NA Qualitative Qualitative Qualitative	NA Mixed Success Mixed
Alcorn, J. B., Kajuni, A. and Winterbottom, B. (2002). <i>Assessment of CBNRM Best Practices in Tanzania</i> , USAID/Tanzania, Tanzania.	SIDA Lamp Community Based Forest Management Activity, Tanzania	A: B: El: En:	NA Qualitative Implied Qualitative	NA Mixed Success Mixed
Alcorn, J. B., Kajuni, A. and Winterbottom, B. (2002). <i>Assessment of CBNRM Best Practices in Tanzania</i> , USAID/Tanzania, Tanzania.	Tanga Coastal Zone CDP(TCZCDP), Tanzania	A: B: El: En:	Implied Qualitative Quantitative Qualitative	Success Success Success Mixed
Alcorn, J. B., Kajuni, A. and Winterbottom, B. (2002). <i>Assessment of CBNRM Best Practices in Tanzania</i> , USAID/Tanzania, Tanzania.	Tungamalenga Village Community Based Wildlife Management Area, Tanzania	A: B: El: En:	NA Implied Qualitative Qualitative	NA Mixed Success Success
Bajracharya, S. B., Furlley, P. A. and Newton, A. C. (2005). Effectiveness of community involvement in delivering conservation benefits to the Annapurna Conservation Area, Nepal, <i>Environmental Conservation</i> , 32 (3): 239-247. (Mehta, J. N. and Heinen, J. T. (2001). Does community-based conservation shape favorable attitudes among locals? An empirical study from Nepal, <i>Environmental Management</i> , 28 (2): 165-177.)	Annapurna Conservation Area (ACAP), Nepal	A: B: El: En:	Qualitative Implied NA Qualitative	Mixed Mixed NA Mixed
Balint, P. J. (2006). Improving community-based conservation near protected areas: The importance of development variables, <i>Environmental Management</i> , 38 (1): 137-148.	El Impossible National Park Projects, El Salvador	A: B: El: En:	Quantitative NA NA Qualitative	Mixed NA NA Mixed
Baral, N. and Heinen, J. T. (2007). Resources use, conservation attitudes, management intervention and park-people relations in the Western Terai landscape of Nepal, <i>Environmental Conservation</i> , 34 : 64-72.	Bardia National Park Buffer Zone, Nepal	A: B: El: En:	Qualitative NA Implied Qualitative	Success NA Success Mixed

Becker, C. D., Agreda, A., Astudillo, E., Costantino, M. and Torres, P. (2005). Community-based monitoring of fog capture and biodiversity at Loma Alta, Ecuador enhance social capital and institutional cooperation, <i>Biodiversity and Conservation</i> , 14 (11): 2695-2707.	Community Based Monitoring Of Fog Capture, Ecuador	A: Qualitative B: Qualitative El: Implied En: Qualitative	Success Success Success Success
Becker, C. D. (2003). Grassroots to grassroots: Why forest preservation was rapid at Loma Alta, Ecuador, <i>World Development</i> , 31 (1): 163-176.			
Blomley, T. (2000). <i>Woodlots, Woodfuel and Wildlife: Lessons from Queen Elizabeth National Park, Uganda</i> , Gatekeeper Series, IIED, London, UK.	Queen Elizabeth National Park Woodlot Project, Uganda	A: Implied B: Qualitative El: Implied En: Qualitative	Mixed Fail Fail Fail
Boonzaier, E. (1996). Local responses to conservation in the Richtersveld National Park, South Africa, <i>Biodiversity and Conservation</i> , 5 (3): 307-314.	Richtersveld Contract, South Africa	A: Qualitative B: NA El: NA En: Qualitative	Fail NA NA Mixed
Browder, J. O. (2002). Conservation and development projects in the Brazilian Amazon: Lessons from the community initiative program in Rondonia, <i>Environmental Management</i> , 29 (6): 750-762.	Rondonia Community Initiative Project, Brazil	A: NA B: Qualitative El: Quantitative En: Qualitative	NA Mixed Mixed Mixed
Campbell, L. M., Haalboom, B. J. and Trow, J. (2007). Sustainability of community-based conservation: sea turtle egg harvesting in Ostional (Costa Rica) ten years later, <i>Environmental Conservation</i> , 34 (2): 122-131.	Ostional Wildlife Refuge, Costa Rica	A: Quantitative B: Quantitative El: Implied En: Quantitative	Success Success Success Success
Campbell, L. M. (1998). Use them or lose them? Conservation and the consumptive use of marine turtle eggs at Ostional, Costa Rica, <i>Environmental Conservation</i> , 25 (4): 305-319.			
Caputo, F. P., Canestrelli, D. and Boitani, L. (2005). Conserving the terecay (<i>Podocnemis unifilis</i> , Testudines : Pelomedusidae) through a community-based sustainable harvest of its eggs, <i>Biological Conservation</i> , 126 (1): 84-92.	Terecay Community Management Programme, Ecuador	A: NA B: Quantitative El: Quantitative En: Qualitative	NA Success Success Success

Chhetri, P., Mugisha, A. and White, S. (2003). Community resource use in Kibale and Mt Elgon National Parks, Uganda, <i>Parks</i> , 13 (1): 28-49.	Kibale National Park Community Resource Management, Uganda	A: Implied B: NA El: Qualitative En: Mixed	Success Success NA Mixed
Daniels, R. and Bassett, T. J. (2002). The spaces of conservation and development around Lake Nakuru National Park, Kenya, <i>Professional Geographer</i> , 54 (4): 481-490.	Lake Nakuru Conservation And Development Project (LNCDP), Kenya	A: NA B: Qualitative El: Quantitative En: NA	NA Fail Fail NA
Dressler, W. H., Kull, C. A. and Meredith, T. C. (2006). The politics of decentralizing national parks management in the Philippines, <i>Political Geography</i> , 25 (7): 789-816.	Puerto Princessa Park Decentralisation, Philippines	A: Implied B: NA El: Qualitative En: Quantitative	Fail NA Fail Fail
Durbin, J. C. and Ratrimoisaona, S. N. (1996). Can tourism make a major contribution to the conservation of protected areas in Madagascar?, <i>Biodiversity and Conservation</i> , 5 (3): 345-353.	Amber Mountain, Madagascar	A: Implied B: NA El: NA En: Quantitative	Mixed NA NA Mixed
Durbin, J. C. and Ratrimoisaona, S. N. (1996). Can tourism make a major contribution to the conservation of protected areas in Madagascar?, <i>Biodiversity and Conservation</i> , 5 (3): 345-353.	Isalo National Park, Madagascar	A: Implied B: NA El: NA En: Quantitative	Mixed NA NA Mixed
Elliot, J. (2001). <i>Wildlife and Poverty Study, Phase 1</i> , Livestock and wildlife advisory group (LWAG), DFID, London, UK.	Kuene Community Based Natural Resource Management, Namibia	A: Qualitative B: NA El: Qualitative En: Quantitative	Success NA Success Success

Fernandes, D. (2006). "More eyes watching..." Community-based management of the Arapaima (<i>Arapaima gigas</i>) in Central Guyana. In <i>Eleventh biennial conference of the International Association for the Study of Common Property (IASCP)</i> , Iwokrama International Centre for Rainforest Conservation and Development, The Center for Agrarian Studies (Pusat Kajian Agraria) of Bogor Agricultural University (Institut Pertanian Bogor), pp. 18.	Arapaima Management Project, Guyana	A: Qualitative B: Qualitative El: Quantitative En: Qualitative	Success Success Success Fail
Fernandes, D. and NRDDDB (2004). <i>Lessons from the Equator Initiative: Community-based Arapaima conservation in the North Rupununi, Guyana</i> , Centre for Community-Based Resource Management, Winnipeg, MB, Canada.			
Fernandes, D. and TIDE (2005). <i>Lessons from the Equator Initiative: Community-based Management of the Port Honduras Marine Reserve, Belize</i> , Centre for Community-Based Resource Management, Winnipeg, MB, Canada.	Port Honduras Marine Reserve, Belize	A: Qualitative B: Qualitative El: Qualitative En: Qualitative	Mixed Mixed Mixed Mixed
Maheia, W. (2003). Learning by doing in Port Honduras Marine Reserve, Southern Belize, <i>Policy Matters</i> , 12 : 246-253.			
Gibson, C. C. and Marks, S. A. (1995). Transforming rural hunters into conservationists - an assessment of community-based wildlife management programs in Africa, <i>World Development</i> , 23 (6): 941-957.	Luangwa valley, ADMADE, Zambia	A: Implied B: Quantitative El: NA En: Quantitative	Fail Fail NA Mixed
Gould, K., Howard, A. F. and Rodriguez, G. (1998). Sustainable production of non-timber forest products: Natural dye extraction from El Cruce Dos Aguadas, Peten, Guatemala, <i>Forest Ecology and Management</i> , 111 (1): 69-82.	Maya Biosphere Reserve Gatherings Project, Guatemala	A: Implied B: Quantitative El: Quantitative En: Quantitative	Mixed Fail Fail Mixed
Haenn, N. (2000). "Biodiversity is Diversity in Use": <i>Community-Based Conservation in the Calakmul Biosphere Reserve</i> , America Verde Working Papers, The Nature Conservancy, Arlington, USA.	Calakmul Community-based conservation, Mexico	A: Qualitative B: Implied El: NA En: Quantitative	Fail Fail NA Mixed
Haenn, N. (1999). The power of environmental knowledge: Ethnoecology and environmental conflicts in Mexican conservation, <i>Human Ecology</i> , 27 (3): 477-491.			
Hartup, B. K. (1994). Community conservation in Belize - demography, resource use, and attitudes of participating landowners, <i>Biological Conservation</i> , 69 (3): 235-241.	Community Baboon Sanctuary, Belize	A: Quantitative B: Quantitative El: Implied En: NA	Success Mixed Mixed NA

Herold-Menzies, M. (2006). Integrating Conservation and Development. What we can learn from Caohai, China, <i>The Journal of Environment and Development</i> , 15 (4): 382-406.	Caohai Conservation And Development Programmes, China	A: Qualitative B: Qualitative El: Implied En: Qualitative	Mixed Mixed Fail Success
Holmern, T., Roskaft, E., Mbaruka, J., Mkama, S. Y. and Muya, J. (2002). Uneconomical game cropping in a community-based conservation project outside the Serengeti National Park, Tanzania, <i>Oryx</i> , 36 (4): 364-372.	Serengeti Regional Conservation Project (SRCP), Tanzania	A: NA B: Qualitative El: NA En: Quantitative	NA Fail NA Fail
Horowitz, L. S. (1998). Integrating indigenous resource management with wildlife conservation: A case study of Batang Ai National Park, Sarawak, Malaysia, <i>Human Ecology</i> , 26 (3): 371-403.	ICDP At Batang Ai National Park, Malaysia	A: Qualitative B: Qualitative El: NA En: Qualitative	Success Success NA Mixed
Ite, U. E. (1996). Community perceptions of the Cross River National Park, Nigeria, <i>Environmental Conservation</i> , 23 (4): 351-357.	Cross River National Park, Nigeria	A: Quantitative B: NA El: NA En: Quantitative	Fail NA NA Fail
King, B. H. (2007). Conservation and community in the new South Africa: A case study of the Mahushu Shongwe Game Reserve, <i>Geoforum</i> , 38 : 207-219.	Mahushu Shongwe Game Reserve At Mzintze, South Africa	A: Quantitative B: Qualitative El: NA En: Qualitative	Mixed Fail NA Mixed
Kingston, D. G. I., Abdel-Kader, M., Zhou, B. N., Yang, S. W., Berger, J. M., van der Werff, H., Miller, J. S., Evans, R., Mittermeier, R., Famolare, L., Guerin-McManus, M., Malone, S., Nelson, R., Moniz, E., Wisse, J. H., Vyas, D. M., Wright, J. J. K. and Aboikonie, S. (1999). The Suriname International Cooperative Biodiversity Group program: Lessons from the first five years, <i>Pharmaceutical Biology</i> , 37 : 22-34.	Suriname International Cooperative Biodiversity Group (ICBG), Suriname	A: NA B: NA El: Qualitative En: Qualitative	NA NA Success Success
Klein, J., Reau, B., Kalland, I. and Edwards, M. (2007). Conservation, development, and a heterogeneous community: The case of Ambohitantely Special Reserve, Madagascar, <i>Society & Natural Resources</i> , 20 (5): 451-467.	Ambohitantely Special Reserve, Madagascar	A: Implied B: Qualitative El: NA En: Qualitative	Fail Fail NA Fail

Klooster, D. (1999). Community-based forestry in Mexico: Can it reverse processes of degradation?, <i>Land Degradation & Development</i> , 10 (4): 365-381. Mexico	San Martin Ocotlan Community Forestry,	A: Qualitative B: Qualitative El: Implied En: Qualitative	Mixed Fail Fail Mixed
Langholz, J., Lassoie, J. and Schelhas, J. (2000). Incentives for biological conservation: Costa Rica's Private Wildlife Refuge Program, <i>Conservation Biology</i> , 14 (6): 1735-1743.	Private Wildlife Refuge Programme, Costa Rica	A: Qualitative B: Implied El: Implied En: Implied	Mixed Success Success Mixed
Lehmkuhl, J. F., Upreti, R. K. and Sharma, U. R. (1988). National parks and local development - grasses and people in Royal Chitwan National Park, Nepal, <i>Environmental Conservation</i> , 15 (2): 143-148.	Royal Chitwan National Park, Nepal	A: Quantitative B: Qualitative El: NA En: Quantitative	Mixed Mixed NA Mixed
Malleon, R. (2002). Changing perspectives on forests, people and 'development': Reflections on the case of the Korup Forest, <i>Ids Bulletin-Institute Cameroon of Development Studies</i> , 33 (1): 94-101.	Korup Project, Cameroon	A: Implied B: Qualitative El: NA En: Qualitative	Fail Fail NA Fail
Manuel-Navarrete, D., Slocombe, S. and Mitchell, B. (2006). Science for place-based socioecological management: lessons from the Maya forest (Chiapas and Petén), <i>Ecology and Society</i> , 11 (1): 8 [online] URL: http://www.ecologyandsociety.org/vol11/iss1/art8/ .	Sustainable Resource Management For Income Generation Of The Maya Biosphere Reserve, Guatemala	A: Implied B: Qualitative El: Implied En: Qualitative	Mixed Success Mixed Success
Marcovaldi, M. A. and dei Marcovaldi, G. G. (1999). Marine turtles of Brazil: the history and structure of Projeto TAMAR-IBAMA, <i>Biological Conservation</i> , 91 (1): 35-41.	Projeto TAMAR-IBAMA, National Marine Turtle Conservation Programme, Brazil.	A: Implied B: Qualitative El: Qualitative En: Quantitative	Success Success Success Success
Marcus, R. R. (2001). Seeing the forest for the trees: Integrated conservation and development projects and local perceptions of conservation in Madagascar, <i>Human Ecology</i> , 29 (4): 381-397.	Ranomafana Nark Park Project, Madagascar	A: Quantitative B: Qualitative El: NA En: NA	Mixed Fail NA NA
Peters, J. (1998). Transforming the integrated conservation and development project (ICDP) approach: Observations from the Ranomafana National Park Project, Madagascar, <i>Journal of Agricultural & Environmental Ethics</i> , 11 (1): 17-47.			

Matzke, G. E. and Nabane, N. (1996). Outcomes of a community controlled wildlife utilization program in a Zambezi Valley community, <i>Human Ecology</i> , 24 (1): 65-85.	Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) at Masoka, Zimbabwe	A: Qualitative B: Qualitative El: NA En: Quantitative	Success Success NA Success
Medeiros, D. (2004). <i>Lessons from the Equator Initiative: Cananéia Oyster Producers' Cooperative, Brazil</i> , Center for Community-Based Resource Management, Natural Resources Institute, University of Manitoba, Winnipeg, MB, Canada.	Cananeia Oyster Producers Cooperative, Brazil	A: NA B: Qualitative El: Implied En: Quantitative	NA Mixed Success Mixed
Mehta, J. N. and Kellert, S. R. (1998). Local attitudes toward community-based conservation policy and programmes in Nepal: a case study in the Makalu-Barun Conservation Area, <i>Environmental Conservation</i> , 25 (4): 320-333.	Makalu Barun National Park, Nepal	A: Quantitative B: Implied El: NA En: Quantitative	Mixed Fail NA Fail
Myers, G. A. (2002). Local communities and the new environmental planning: a case study from Zanzibar, <i>Area</i> , 34 (2): 149-159.	Jozani-Chwaka Bay Conservation Area (JCBCA), Tanzania	A: Quantitative B: Qualitative El: NA En: NA	Fail Fail NA NA
Nielsen, E. A. (2001). <i>Community-Based Ecotourism Development and Management in the Rio Platano Man and the Biosphere Reserve, Honduras</i> , International Conservation Program, The Nature Conservancy, Arlington, VA, USA.	Las Marias Ecotourism Project, Honduras	A: Qualitative B: Qualitative El: NA En: Quantitative	Success Mixed NA Success
Ramangason, G. S. (1993). The Mananara-Nord Biosphere Reserve, <i>Nature & Resources</i> , 29 (1-4): 17-23.	Mananara-Nord Biosphere, Madagascar	A: Implied B: NA El: Qualitative En: Quantitative	Fail NA Mixed Success
Ross, S. and Wall, G. (1999). Evaluating ecotourism: The case of North Sulawesi, Indonesia, <i>Tourism Management</i> , 20 (6): 673-682.	Bunaken National Park, Indonesia	A: Implied B: Implied El: Qualitative En: Quantitative	Fail Mixed Fail Mixed

Ross, S. and Wall, G. (1999). Evaluating ecotourism: The case of North Sulawesi, Indonesia, <i>Tourism Management</i> , 20 (6): 673-682.	Tangkoko Duasudara Nature Reserve, Indonesia	A: B: El: En:	Qualitative Implied NA Qualitative	Fail Fail NA Fail
Ruiz-Pérez, M., Almeida, M., Dewi, S., Lozano Costa, E. M., Ciavatta Pantoja, M., Puntodewo, A., de Arruda Postigo, A. and Goulart de Andrade, A. (2005). Conservation and Development in Amazonian Extractive Reserves: The Case of Alto Juruá, <i>Ambio</i> , 34 (3): 218-223.	Alto Juruá Extractive Reserve, Brazil	A: B: El: En:	Implied Qualitative Quantitative Qualitative	Success Mixed Mixed Success
Schafer, J. and Bell, R. (2002). The state and community-based natural resource management: the case of the Moribane Forest Reserve, Mozambique, <i>Journal of Southern African Studies</i> , 28 (2): 401-420.	Moribane Forest Reserve, Mozambique	A: B: El: En:	Implied Qualitative NA Poor	Fail Fail NA Fail
Schwartzman, S. and Zimmerman, B. (2005). Conservation Alliances with Indigenous Peoples of the Amazon, <i>Conservation Biology</i> , 19 (3): 721-727.	Xingu Lands Indigenous Association (Atix), Brazil	A: B: El: En:	Implied Qualitative Qualitative Qualitative	Success Mixed Mixed Success
Senyk, J. P. J. (2006). <i>Concurrent Conservation and Development: Lessons Learned from a Community-Based Case in Thailand</i> , Thesis submitted for the degree of Master of Natural Resources Management, Natural Resources Institute, University of Manitoba, Winnipeg, MB, Canada.	Pred Nai Community Forestry Group, Thailand	A: B: El: En:	Implied Qualitative Implied Qualitative	Success Success Success Success
Shukla, S. (2004). <i>Lessons from the Equator Initiative: Rural Commune's Medicinal Plant Conservation Centre, Pune, India</i> , Center for Community-Based Resource Management, Natural Resources Institute, University of Manitoba, Winnipeg, MB, Canada.	Rural Communes Medicinal Plant Conservation Center, India	A: B: El: En:	NA NA Qualitative Qualitative	NA NA Success Success
Stem, C. J., Lassoie, J. P., Lee, D. R., Deshler, D. D. and Schelhas, J. W. (2003). Community participation in ecotourism benefits: The link to conservation practices and perspectives, <i>Society & Natural Resources</i> , 16 (5): 387-413.	Corcovado Piedrasbalances National Park, Costa Rica	A: B: El: En:	Quantitative Quantitative Quantitative Implied	Mixed Success Success Mixed

Stocking, M. and Perkin, S. (1992). Conservation-with-Development - an application of the concept in the Usambara Mountains, Tanzania, <i>Transactions of the Institute of British Geographers</i> , 17 (3): 337-349.	The East Usambaras Agricultural Development Project, And Environmental Conservation Project, Tanzania	A: B: El: En:	Implied Qualitative Qualitative Qualitative	Success Fail Mixed Mixed
Tai, H. S. (2007). Development through conservation: An institutional analysis of indigenous community-based conservation in Taiwan, <i>World Development</i> , 35 (7): 1186-1203.	Li-Chia conservation project, Taiwan	A: B: El: En:	NA Qualitative Qualitative Qualitative	NA Success Success Mixed
Tai, H. S. (2007). Development through conservation: An institutional analysis of indigenous community-based conservation in Taiwan, <i>World Development</i> , 35 (7): 1186-1203.	Shan-Mei Common-Pool-Resource Initiative, Taiwan	A: B: El: En:	NA Qualitative Qualitative Qualitative	NA Success Success Success
The Bawa Village Community (1997). Mozambique's Tchuma Tchato initiative of resource management on the Zambezi: A community perspective, <i>Society & Natural Resources</i> , 10 (4): 409-413.	Tchuma Tchato, Zimbabwe	A: B: El: En:	Implied Qualitative Qualitative Qualitative	Mixed Success Success Mixed
Tobey, J. and Torell, E. (2006). Coastal poverty and MPA management in mainland Tanzania and Zanzibar, <i>Ocean & Coastal Management</i> , 49 (11): 834-854.	Mafia Island Marine Protected Area, Tanzania	A: B: El: En:	Implied Qualitative Qualitative Qualitative	Mixed Mixed Success Mixed
Topp-Jørgensen, E., Poulsen, M. K., Lund, J. F. and Massao, J. F. (2005). Community-based Monitoring of Natural Resource Use and Forest Quality in Montane Forests and Miombo Woodlands of Tanzania, <i>Biodiversity and conservation</i> , 14 (11): 2653-2677.	Mema Iringa District Participatory Forest Management, Tanzania	A: B: El: En:	NA Quantitative Qualitative Quantitative	NA Mixed Success Mixed
Wagner, J. (2007). Conservation as Development in Papua New Guinea: The View from Blue Mountain, <i>Human Organization</i> , 66 (1): 28-37.	Kamiali ICDP, Papua New Guinea	A: B: El: En:	Implied NA NA Qualitative	Fail NA NA Mixed

Wainwright, C. and Wehrmeyer, W. (1998). Success in integrating conservation and development? A study from Zambia, <i>World Development</i> , 26 (6): 933-944.	Luanga Integrated Resource Development Project, Zambia	A: B: El: En:	Implied Implied NA Qualitative	Mixed Mixed NA Fail
Zhang, L. and Wang, N. (2003). An initial study on habitat conservation of Asian elephant (<i>Elephas maximus</i>), with a focus on human elephant conflict in Simao, China, <i>Biological Conservation</i> , 112 (3): 453-459.	Living With The Elephant ICDP, China	A: B: El: En:	Qualitative Qualitative NA Qualitative	Success Success NA Success
Zimmerman, B., Peres, C. A., Malcolm, J. R. and Turner, T. (2001). Conservation and development alliances with the Kayapo of south-eastern Amazonia, a tropical forest indigenous people, <i>Environmental Conservation</i> , 28 (1): 10-22.	Pinkaiti Research Station, Brazil	A: B: El: En:	NA Qualitative Quantitative Qualitative	NA Mixed Success Success