

Predicting Attitudes towards Protected Area Management in a Developing Country Context

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Abstract

Biodiversity conservation through use of protected areas relies significantly on the attitudes of local adjacent communities. Some studies suggest that attitudes are often shaped by the associated positive and negative externalities and socio-demographic and economic characteristics of local communities living adjacent to protected areas. The current study sought to identify useful predictors of local attitudes towards protected area management. It was conducted at Bwindi Impenetrable National Park in Uganda where several interventions in form of benefits to improve local people's attitudes towards the park have been implemented for the last 30 years. The study examined the extent to which these benefits can influence local people's attitude towards management of the Protected Area (PA). A household survey was conducted among 190 randomly selected respondents and Generalised Linear Mixed Models (GLMMs) fitted where the dependent variable was a binary "Good" or "otherwise" response to how the respondent considered own relationship with park management. Socio-economic attributes of the respondents were used as control variables. The importance of cost variables (e.g. crop raiding) was also examined. The study found that only direct and material benefits were consistent predictors of a positive attitude towards management. Non-material and indirect benefits as well as the socio-economic factors and costs did not influence the attitude of local communities towards management. It can be concluded that positive attitude towards protected area management is determined by access to direct and material benefits by local communities and not socio-economic factors or costs incurred. Interventions intended to influence local communities to have a positive attitude towards management ought to emphasize direct and material benefits.

Keywords: Bwindi, protected area benefit sharing, tourism revenue

1. Introduction

Protected areas (PAs) cover about 12% of the earth's land area and are usually established for in situ conservation (Chape et al. 2005) and tourism (Walpole & Goodwin 2001). The debate on management of protected areas has always had the human dimension (Buscher & Whande 2007) because the relationship between local communities and management is critical for the success of biodiversity conservation (Muhumuza & Balkwill 2013). So important is this dimension that both in theory and practice, the history of conservation as well as its present have largely been about handling it. In the earlier days, conservation efforts were pre-occupied with how to forcefully exclude people from areas declared PAs using the command and control management approach (Hutton et al. 2005). The present, and probably the future of conservation is on how to incorporate people in PA management preferably in ways that lead to win-win outcomes for conservation and local people (Infield 2001; Wells & McShane 2004).

In general, it is now accepted that even though strict and militaristic approaches can in practice suppress local dissent to PA management (Brockington 2004), local people's support is still necessary to deliver social justice in

conservation (Ribot 2010) and studies of local people attitudes remain relevant and may guide the revision and development of appropriate management strategies (Parry & Campbell 1992; Røskaft et al. 2007; Songorwa 1999). Understanding local attitudes is vital in managing PA-people relations (Allendorf et al. 2006; Weladji et al. 2003). After all, “attitude change is often the only tool available to conservationists when approaches such as regulation are ineffective” (Waylen et al. 2009:350). The importance of attitudinal studies is further underscored by what looks a common denominator for all PAs; a history of marginalization of local people (activities) by former PA policies and legislation (Ghimire & Pimbert 1997; Wilkie et al. 2006). This created local hatred and resentment expressed covertly and in some instances overtly. Damage caused by the conserved wildlife has been another cause of antagonistic attitudes both in the developing as well as in the developed countries. Examples include the Norwegian sheep farmers against large carnivores (Røskaft et al. 2007), in Wisconsin (USA) against wolves (Naughton-Treves et al. 2003), against wildlife in general around Selous game reserve in Tanzania (Songorwa 1999).

At Bwindi Impenetrable National Park (Bwindi INP here after) in Uganda where this study was conducted, forceful conversion of the area into a national park in 1991 resulted into antagonistic relationships between the local people and the park (Baker 2004; Namara 2000; Sandbrook 2006). However, to help improve the appeal of PAs to local people a general approach in PA management has been the pursuit of park outreach programmes and involving local people in PA management. These are recognized to potentially motivate local people to change their attitudes towards PAs and consequently adopt conservation friendly behaviours (Gadd 2005; Holmes 2003; Mehta & Heinen 2001; Spiteri & Nepal 2006; Spiteri & Nepal 2008). Although it is now accepted that favorable attitudes may not directly translate into conservation friendly behavior (Waylen et al. 2009), psychologists and conservationists agree that attitudes are a useful predictor of behavior (Ajzen 2005; Waylen et al. 2009).

Bwindi INP is a pioneer site for such inclusionary approaches in Uganda but also one of the earliest in East Africa. It is claimed a success story in some circles. To the credit of these approaches and the change in attitudes they have inspired, stories are told of how the local people are conservation friendly. As a testimony to this, mention is made of an incident where a community that in 1991 set fire to about 10 sq kms of forest in protest of the area’s reservation, in a twisted state of affairs walked five hours moreover without any remuneration to put out an accidental fire in 1998 (WWF 2006). It is to the credit of the changed attitudes that conservation management at Bwindi INP has been claimed a success. As an indicator, the management regime is credited with an estimated increase of about 7% in the total population size of the area’s flagship species (the mountain gorilla) between 1997 and 2002 and 12% between 1997 and 2006 (Guschanskia et al. 2009; McNeillage et al. 2006; Olupot et al. 2009) gradually ranging over larger areas (Blomley et al. 2010). In comparison, nearly all other great ape African sites have been experiencing sharp declines for decades now (Caldecott & Miles 2005). Bwindi is therefore often tipped as a successful case of in situ conservation and it is therefore worth to investigate how and why such changes in attitudes came about but to also interrogate current attitudes considering that attitudes are not static. It is in this respect that the current study sought to determine how local people viewed their relationship with the park management and which factors could predict their attitude. We explored the question whether the costs and benefits associated with the park, and socio-economic and demographic characteristics of the local communities influenced their attitude. We envisage that the findings from this study will be useful in guiding policy interventions focusing on improving the relationship between local communities and PAs management.

2. Conceptual Framework and Research Hypotheses

Our definition of attitude is guided by attitude theory (Ajzen & Fishbein 1980); attitude is a human psychological tendency that is expressed in evaluating a particular decision or object with or without favour. Attitudes consist of beliefs; associations that the people consciously or unconsciously establish between the attitude object and some attributes. For example, in the phrase “I have a good relationship with management of Bwindi INP”, management is the main attitude object and good is the attribute. An attribute therefore is the perceived or otherwise experienced outcome of the interaction between management and people as the former goes about own duties in managing the national park.

Empirical evidence suggests that local people’s attitudes towards PA are largely influenced by the incurrence of costs and attainment of benefits from living in or around a PA against some background socio-economic and household demographic situations (Infield & Namara 2001; Shibia 2010; Macura et al. 2011). Also identified as important is the extent to which local people are involved in PA management (Mehta & Heinen 2001). In some instances, the relationship with park management may even be more important. The following hypotheses were made:

- i. In the heterogeneous community adjacent to the park, socio-demographic factors are likely to exhibit some trend in influencing attitude towards PA management.
- ii. Local people who participate in park projects and programmes are more likely to view their relationship with PA management favourably.
- iii. Local people experiencing costs of wildlife conservation are less likely to have a favourable attitude towards PA management. Conversely, local people receiving park benefits are more likely to have a favourable attitude towards PA management.

3. Context

3.1 General Characteristics

Bwindi Impenetrable National Park covers 330 km² of afro-montane forest located in the South-Western corner of Uganda on the edge of the Albertine Rift Valley (Figure 1). Albertine Rift Valley is a region with a high biodiversity as well as a high degree of endemic species (Hamilton 1976; Shaw 2010). The valley is globally famous for its biodiversity resulting from proximity to a Pleistocene refugium for many species of flora and fauna that are now known to be endemic to the Rift (Hamilton 1976; Shaw 2010). The area was managed by the local people as a commons until 1932 when it was designated as the Kasatoro and Kayonza Crown Forests to protect and preserve the Mountain Gorilla (UWA 2001). With this change, communities sought permission from the colonial administrators to access the resources in the reserve. However, hunting and cultivation continued inside the forest area. In 1942 the two Crown Forests were unified as Bwindi Impenetrable Central Crown that in 1961, just a year before Uganda attained political independence, was gazetted a gorilla sanctuary. The introduction of the 1964 Forest and Game Acts by the post-independence Uganda government resulted in dual management of the area by the newly formed Forest and Game departments as a forest reserve as well as a game sanctuary. Both departments banned residing and farming inside the forest area, the game department banned hunting, while the Forest Department allowed local collection of forest products for subsistence and licensed timber concessions.

In 1991, the area was designated Bwindi INP and put under the management of the Uganda Wildlife Authority (UWA). Because of its ecological qualities as a home to endangered and endemic species, Bwindi INP is from 1994 listed as a UNESCO world heritage site (<https://whc.unesco.org/en/list/682>) and has also been identified by IUCN as one of the most important forests to be conserved in Africa (IUCN 2010).

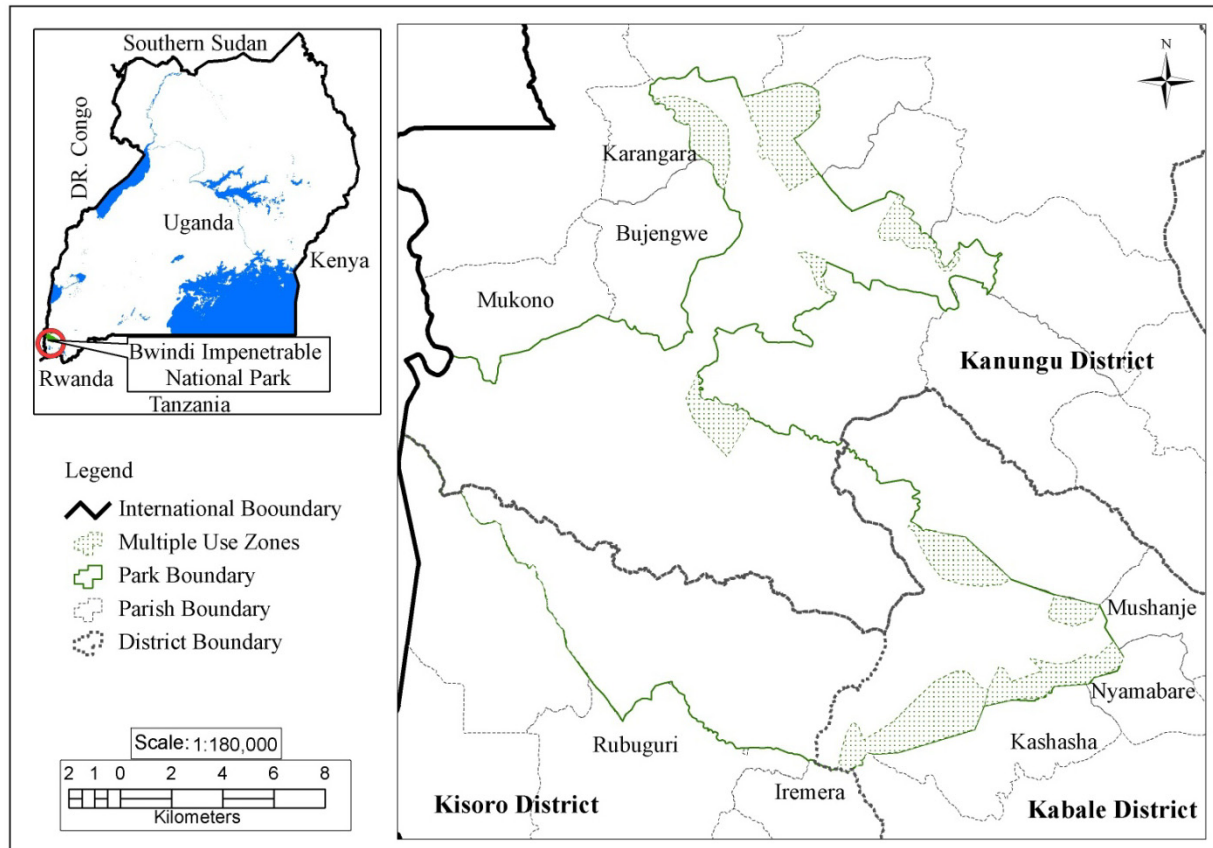


Figure 1. Map of Uganda (inset) showing the location of Bwindi Impenetrable National Park (Bwindi INP) and map of Bwindi INP showing Multiple Use Zones and sample villages

There are only two remaining habitats for mountain gorillas (*Gorilla beringei beringei*), and Bwindi INP constitutes one of these. IUCN has listed this subspecies as “Critically Endangered” (IUCN 2011). According to a census that was carried out in 2011 in Bwindi, 400 mountain gorillas live there. Besides, 480 mountain gorillas (2010 census) live in a nearby but totally separated mountain area of about 450 km² on the border of Rwanda (Volcanoes NP), Democratic Republic Congo (Virunga NP) and Uganda (Mgahinga NP), whereas four orphaned mountain gorillas are placed in a sanctuary in DR Congo (IGCP 2010; UWA 2001).

3.2 Local Demography

The local people in the Bwindi area are of different ethnic origins. The dominant group is Bantu constituted by a 90% Bakiga population, 9.5% Bafumbira and the other remaining 0.5% is constituted by the Batwa, Bahororo, Bahunde, and recent immigrant communities from DR Congo, Rwanda and other areas of Uganda (Plumptre et al. 2004; UWA 2001). The area’s population has grown substantially in the last decades, and the population density is one of the highest in rural areas on the whole African continent (UWA 2001). By 2000 an estimated 170.000 people lived in the Ugandan parishes directly bordering Bwindi (Hamilton et al. 2000). Seventeen years later, the figure can be expected to be much higher due to the increasing arrival of immigrants and the natural population growth.

Land holdings are small and fragmented (Ellis & Bahiigwa 2003), but subsistence agriculture remains the main occupation of almost all the inhabitants. The area has rich volcanic soils and abundant rainfalls. Acute land shortage and low soil productivity characterize the areas immediately outside the park (UWA 2001), and the majority of the local population live in extreme poverty (Lanjouw et al. 2001).

3.3 People’s Relationship with Park Management

Designation of Bwindi as a national park restricted local access to in-park resources, eliciting local resistance that was expressed in various ways. In one incident in the first dry season after the park was designated, there were sixteen fires, some of which were found to have been deliberately set or left to burn. These fires destroyed an estimated 5% of the forest (Hamilton et al. 2000). The local people were further angered by what they saw as

negligence on the part of park management in failing to control crop raiding (Baker 2004). Local people threatened to hurt the gorillas (Namara 2000). Park employees and local people did not trust - and had ill feelings for - each other (Sandbrook 2006). However, because of the above park-based projects, programmes and benefits, it is suggested that the local relationship between people and the park and between people and management has improved (Blomley et al. 2010; WWF 2006). Park management has put in place mechanisms for securing a better relationship with local people. Perhaps most notably is the national tourism revenue sharing policy whose explicit goal is to “ensure that local communities living adjacent to PAs obtain benefits from the existence of these areas, improve their welfare, and ultimately strengthen partnerships between the Uganda Wildlife Authority (UWA), local communities and local governments for sustainable management of resources in and around PAs” (UWA 2000:6). Management is also helping fight crop raiding through HUMAN-GORILLA conflict resolution groups (HUGOs).

4. Methods

4.1 Data Collection

Based on the knowledge that incidence of wildlife damages and realization of park-related benefits frequently depend on proximity to the park, villages in the 21 frontline parishes adjacent to Bwindi were stratified into those that share a boundary with the park and those that do not. Eight villages sharing a boundary with the park and a further three villages not bordering the park were randomly selected. For each sample village, its local leader was approached to introduce the study and explain its purpose as purely scientific and academic, with no legal implications whatsoever. It was clarified that all the responses were to be treated anonymously and with confidentiality. The same explanation was given to all our respondents. The assurances were necessary for ethical reasons but also because we suspected that respondents could have felt uneasy to give views that may be construed to be against PA management.

In the end, 141 households were randomly selected from the border villages and 49 from the three non-border villages using the Slovin formula i.e. $n = N / (1 + Ne^2)$ where n is the sample size and N was the total number of households and e is the margin of error (Tejada & Punzalan 2012). Settlements of Batwa were not included. This was so as to avoid ethnic variation, and any associated socio-economic and attitudinal variation. We used a household survey that combined semi-structured individual household interviews and village level focus group discussions (FGDs) to determine attitudes towards Bwindi INP and the best predictor(s) of a positive attitude.

Interviews were conducted at the respondents' homes with the household heads, but in a few circumstances with the most senior and knowledgeable of the adults available when the household head was not available. These interviews were conducted by a trained team that was fluent in English and the language spoken in the locality. The interviewers had no previous relationship with the local people in terms of the park, and had not participated in activities restricting local access to PA resources. Prior to these interviews, a draft semi-structured questionnaire was explained to and discussed with the interviewers and one other independent researcher. The discussions focused on the flow of the questions, clarity, and whether the questions would generate the required information. Following this discussion, a pilot questionnaire that reflected appropriate suggestions was adopted from the draft.

Pre-testing was done in two randomly selected villages (not part of the already selected sample villages). Pre-testing allowed the interviewers to gain familiarity with the questionnaire and offered an opportunity for them to apply and review the method. The focus was on respondents' understanding of questions (and how this understanding differed from those intended) and any problems respondents encountered in answering the questions. Additional changes were proposed, reviewed, and incorporated into the final questionnaire that was eventually applied in the data collection.

Each of the 190 sample households said yes or no to attaining the ten benefits at any point in time since the elevation of Bwindi to national park status that included:

- (i) Agricultural support: Different forms of support have over time been extended to park neighbours with an aim of increasing productivity on farm and reducing local dependence on park resources.
- (ii) Tree planting: Tree planting has at different times been supported amongst park neighbours as a means of providing alternatives to park tree resources.
- (iii) Goats: In line with the national legislation requiring that each national park shares 20% of its gate fees with local communities, management at Bwindi has been doing so and since 2006 this money has been used to buy goats that were then distributed amongst local households.
- (iv) Multiple use zones: After gazettement Bwindi a national park, management piloted in 1993 a multiple use

programme that continues to date. Under this programme, registered members of selected communities are allowed through a formal agreement to access resources in 20% of the park area.

(v) Education: Educational benefits arise from attendance in schools built by a park-based, attainment of a scholarship from a park-based initiative (e.g. tourists).

(vi) Health care: The healthcare benefit is realised from attainment of health services from facilities that have been established in the area by any park-based initiative.

(vii) Roads: As a way of facilitating tourism activities, a number of road works (including construction and maintenance) are regularly undertaken. These roads inevitably serve the communities as well.

(viii) Security: Efforts to provide security (by armed guards) to secure the lives and properties of tourists potentially provides increased security for the local people as well.

(ix) Transportation: Traffic into and out of the national park provides local people with opportunities for lifts (paid or unpaid) in an otherwise hard to reach area.

(x) Employment: The national park presents a couple of possibilities for employment of the local people, for example through provision of services (e.g. porter) in the tourism activities.

4.2 Categorisation of Benefits

The ten benefits were further categorised along two dimensions. The first is based on the extent to which they are direct while the second is on their material nature. Thus education, health care, goats, agricultural support, tree planting, and multiple use zones provide direct benefits and the others (employment, roads, transportation, and security) are indirect benefits. They are indirect in the sense that they are only realised as positive spill overs (externalities) from activities with not having local people's well-being or their attitudes as a primary goal. In yet another categorisation, multiple use zones, tree planting, goats, agricultural support, and employment are identified as providing material benefits while the others are non-material.

4.3 Cost Variables

The two cost variables covered in this study were wildlife damage and fines. Bearers of former costs were households reporting to have incurred a wildlife-related damage (to people, livestock or crops) within the 12 months preceding the study, bearers of the latter reported ever experiencing a park fine for any trespass since the establishment of the park.

4.4 Data Processing

The Generalised Linear Mixed Models (Logan 2010) fitted all have one dependent variable – a binary “Good” or “otherwise” response to how the respondent considers own relationship with park management. All the three models share similar control and cost variables (Table 1), but differ in treatment of the benefits. Model A includes all the 10 benefits specified as separate, independent variables. For Model B benefits are input as a simple count of direct (0 - 4) or indirect (0-6) benefits realised by each household. For Model C, benefits were categorized and counted as material or non-material benefits (0-5 for both categories). A log-link function was used in all cases and the exponentials of the model coefficients were derived for easy interpretations as odds-ratios.

5. Results

5.1 Description of the Control and Cost Variables

Household heads were on average in a productive age category, but with low levels of formal education (Table 1). Up to 70% of the heads had no more than primary level of education. Less than 10% of the households (HHs) were female headed. In terms of family size, an average household had 3.4 adult equivalent units. Households operated a relatively diversified portfolio and derived incomes from multiple sources, combining on-farm with non-farm activities and some collection of environmental resources. The latter contributed up to 18.2% of the average HH's annual total income of about \$1038 (or \$0.54/capita/day). Only about 2% of the environmental income was from the park even though average neighbor household lived only about half an hour's walk to the boundary of the park.

Table 1. Description of control variables

<i>Control variables</i>	Unit	Sample statistics
HHH age	Years	45.3(1.0)
HHH education	Years	6.9(0.3)
Female headed HH	% count	9.1
HH adult equivalents	Number	3.4(0.1)
Time to walk to park edge	Minutes	34.6(1.5)
Diversification index	Number	0.4(0.0)
Relative EI	%	18.2
HH annual income	USD	1,038(140)

N=190; in the case of continuous variables average values are specified with corresponding standard errors in parentheses while percentages are specified for categorical variables.

5.2 Extent of Realization of Protected Area Benefits and Costs

There was a wide variation in the extent to which households reported receipt of the different benefits (Figure 2). Some benefits such as health care, education, security, and transportation were generally received by more than 50% of the sample households while others had been experienced by fewer households, some as low as less than 10% (collection of resources from Multiple Use Zones (MUZ), tree planting, goats, and employment).

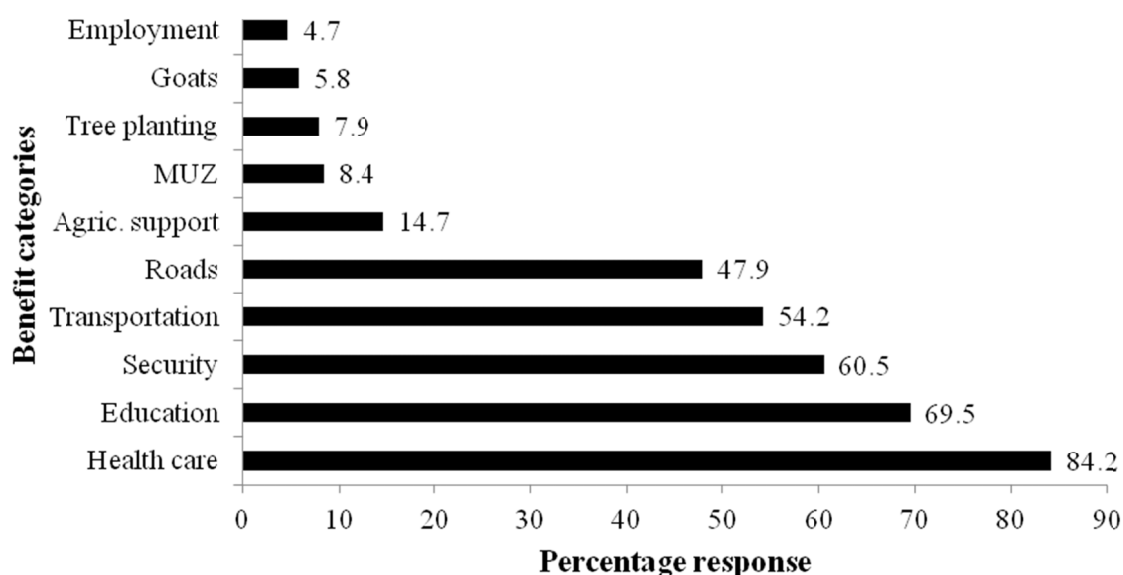


Figure 2. Reported realization of park benefits by households adjacent to Bwindi Impenetrable National Park, Uganda

In terms of costs, only 23.7% of the sample households had experienced either crop raiding or an attack on domestic animals by the park’s wildlife in the 12 months preceding the study while only 6.8% had ever experienced a fine for a park trespass ever since the forest was designated as a park.

5.3 Relationship with Park Management

Majority (64%) of the households reported a good relationship with park management and only 15% reported it as bad (Figure 3).

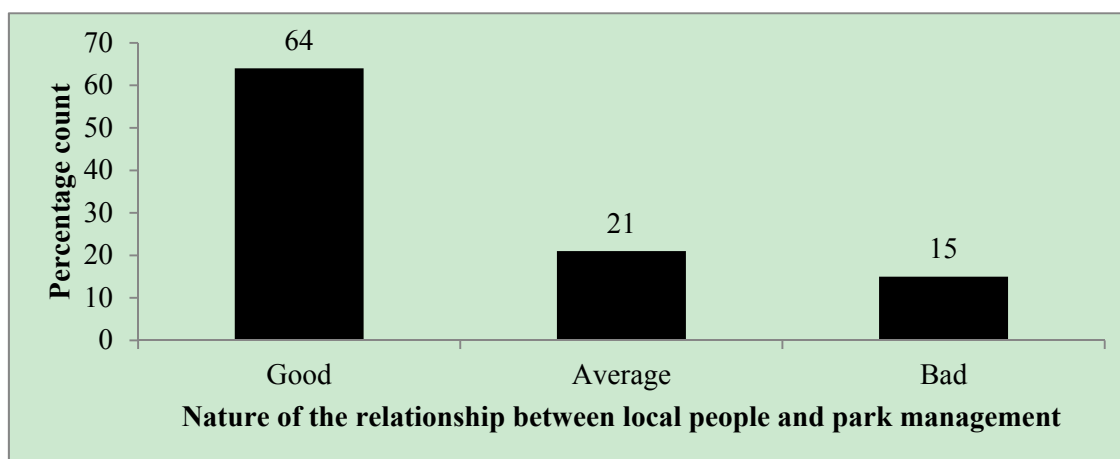


Figure 3. Nature of the relationship between local people and the management of Bwindi Impenetrable National Park, Uganda as reported by the local people

To model factors influencing attitudes, a binary dependent variable was used where a household perceived its relationship with park management as good or otherwise. As depicted in Model A (Table 2), beneficiaries of the tourism revenue sharing scheme in the form of goat sharing, health care services and transportation were significantly more likely to have a positive attitude towards the park management than non-beneficiaries. All the remaining seven benefit variables and the two cost variables exhibited no significant influence. In Model B, residence closer to the park boundary and receipt of direct benefits were significantly more likely to influence a positive attitude towards the park management while from Models C receipt of material benefits is observed to have the same effect. These results indicate that direct and material benefits are more capable of influencing local attitudes towards PA management. The tendency for these benefits to concentrate closer to the park boundary possibly explains the observed likelihood of more positive attitudes closer to the boundary.

Table 2. Factors influencing attitude towards Protected Area management at Bwindi Impenetrable National Park, Uganda

Variable	Model A	Model B	Model C
HHH age	1.00	1.00	1.00
HHH education	1.03	1.03	1.05
HHH female	1.09	0.88	0.79
HH adult equivalents	0.92	0.93	0.92
Wealth	1.00	1.00	1.00
Total net income	1.00	1.00	1.00
Relative environmental income	0.24	0.50	0.39
Diversification index	0.30	0.37	0.37
Distance to the park (minutes)	0.99	0.97 *	0.99
Multiple Use Zone beneficiary	0.98		
Tree planting beneficiary	1.10		
Agricultural support beneficiary	1.52		
Goat recipient	8.42 *		
Health care beneficiary	3.31 **		
Education beneficiary	0.80		
Employment beneficiary	3.00		
Roads beneficiary	8.50		

Transportation beneficiary	1.43 **		
Security beneficiary	1.38		
Wildlife damage cost bearer	1.11	1.15	1.07
Fine recipient	0.29	0.58	0.58
Count of direct benefits		1.52 **	
Count of indirect benefits		0.85	
Count of material benefits			1.96 **
Count of non-material benefits			0.97
Intercept	3.71	3.64	4.92 *
AIC	263.36	267.2	266.26

N = 190; For binary variables (individual benefit and cost variables and HHH gender): no = 0 and yes = 1; AIC is the Akaike Information Criterion (lower value signifies a better fit); *, and ** indicate significant coefficients at significance levels of 0.10, and 0.05 respectively

6. Discussion and Conclusion

That majority of the respondents had a positive attitude towards the PA management suggests that past events at Bwindi INP where people were very violent, negative towards park management and caused UWA employees to live in perpetual fear for their lives (Sandbrook 2006) had changed. A positive attitude from PA neighbours is often a significant indicator of PA success (Struhsaker et al. 2005). The trend observed may be due to increase in benefits that are currently accessed by local communities through interventions of the park management or a hope that local people have in a better future with a better response from management to wildlife damage and flow of benefits (Tumusiime & Svarstad 2011; Tumusiime et al. 2018). The findings did not support the hypothesis that local attitude towards PA management is influenced by socio-economic variables. This supports patterns observed elsewhere and suggests a moderating rather than deterministic role of socio-economic status as a set of variables that influence attitudes of local communities towards PA management (see Van Liere & Dunlap 1980; Milbrath 1984; Samdahl & Robertson 1989; Vaske et al. 2001; in Allendorf et al. 2006).

The study found that local community members who had access to direct and material benefits expressed a consistent positive attitude towards management in all the three models. Studies done by Baral and Heinen (2007) found a similar trend in Nepal in which access to resources was a key determinant for a positive attitude towards park management. Similarly, Gillingham and Lee (1999) found that access to material benefits such as game meat was partly the reason local communities living around Selous Game Reserve, Tanzania had a positive attitude towards the personnel of government wildlife management agency. Non-material and indirect benefits did not influence the attitude of local communities towards management. The study reaffirms the importance of providing tangible economic benefits and integrating human development needs in conservation interventions as critical in the quest for a positive attitude of local communities towards PA management (Gillingham, & Lee, 1999).

The current study did not find any significant relationship between cost variables and attitudes to PA management. This is contrary to what some studies (e.g. Mugisha 2002; Baral & Heinen 2007) have reported that losses incurred by local communities due to being adjacent to PA leads to negative attitudes towards PA management. The scenario observed in the current study suggests that the direct and material benefits accessed by local communities may have assuaged the impacts of the costs incurred by the local communities by park to an extent that the communities can discount them thus remain with a positive attitude towards PA management. It is therefore imperative that conservationists consider advocating for policies that promote improving access to direct and material benefits to local communities in order to have a positive attitude towards PA management. There is need for further studies to determine the most optimal direct and material benefits that can ensure that local communities remain with a positive attitude towards PA management.

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