Penetrating the Impenetrable: Establishing profiles and motivations of resource users at Bwindi Impenetrable National Park, Uganda

Mariel Harrison
2013

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science and the Diploma of Imperial College London
DECLARATION OF OWN WORK

I declare that this thesis, “Penetrating the Impenetrable: Establishing the profiles and motivations of resource users at Bwindi Impenetrable National Park, Uganda,” is entirely my own work, and that where material could be construed as the work of others, it is fully cited and referenced, and/or with appropriate acknowledgement given.

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                         Dr Julia Baker
                         Andrew Gordon-Maclean
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Cover photo: Morning mist over Bwindi’s boundary, Rushaga, July 2013.
Credit: Mariel Harrison
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<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ARU</td>
<td>Authorised Resource User</td>
</tr>
<tr>
<td>BMCT</td>
<td>Bwindi and Mgahinga Conservation Trust</td>
</tr>
<tr>
<td>BNS</td>
<td>Basic Necessities Survey</td>
</tr>
<tr>
<td>CARE</td>
<td>Cooperative for Assistance and Relief Everywhere</td>
</tr>
<tr>
<td>CCR</td>
<td>Community Conservation Ranger</td>
</tr>
<tr>
<td>CTPA</td>
<td>Conservation Through Poverty Alleviation</td>
</tr>
<tr>
<td>CTPH</td>
<td>Conservation Through Public Health</td>
</tr>
<tr>
<td>DTC</td>
<td>Development Through Conservation</td>
</tr>
<tr>
<td>FGD</td>
<td>Focus Group Discussion</td>
</tr>
<tr>
<td>ICD</td>
<td>Integrated Conservation and Development</td>
</tr>
<tr>
<td>IIED</td>
<td>International Institute for Environment and Development</td>
</tr>
<tr>
<td>IGCP</td>
<td>International Gorilla Conservation Programme</td>
</tr>
<tr>
<td>ITFC</td>
<td>Institute of Tropical Forest Conservation</td>
</tr>
<tr>
<td>LC</td>
<td>Local Council</td>
</tr>
<tr>
<td>MUP</td>
<td>Multiple Use Programme</td>
</tr>
<tr>
<td>MUZ</td>
<td>Multiple Use Zone</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organisation</td>
</tr>
<tr>
<td>RPA</td>
<td>Reformed Poachers Association</td>
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<tr>
<td>RRT</td>
<td>Randomised Response Technique</td>
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<tr>
<td>SSI</td>
<td>Semi-Structured Interview</td>
</tr>
<tr>
<td>UCT</td>
<td>Unmatched Count Technique</td>
</tr>
<tr>
<td>URU</td>
<td>Unauthorised Resource User</td>
</tr>
<tr>
<td>UWA</td>
<td>Uganda Wildlife Authority</td>
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</table>
Abstract

Overexploitation of natural resources threatens biodiversity and delivery of ecosystem services globally. In the developing world, exploitation is often driven by need. Acknowledging this, Integrated Conservation and Development (ICD) aims to reduce anthropogenic pressures on the environment by alleviating poverty. However, the promised ‘win-win’ solution has remained elusive.

Using Bwindi Impenetrable National Park in Uganda as a case study, this project aimed to improve the effectiveness of future ICD by evaluating the links between poverty and conservation, and establishing the profiles and motivations of resource users. It found that unauthorized resource use is probably undertaken by the poorest members of society, who live closest to the Park and furthest from markets. The most commonly extracted resources are bushmeat and firewood, primarily for subsistence. Resource exploitation is encouraged by negative attitudes towards the National Park as a result of crop raiding, inequity of revenue sharing and lack of employment, all of which contribute to, or fail to alleviate, local poverty.

Law enforcement is currently the greatest deterrent against unauthorized activity, but ICD could be more effective at reducing threats in the future if sufficient benefits are delivered direct to communities, as evidenced in some areas around the Park.

Word Count: 15,075
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Finally, and most importantly, I thank the people of Bwindi for participating in this research. I sincerely hope that it helps to improve people’s lives and protect Bwindi for long into the future.
1. Introduction

Global biodiversity is threatened by human demands on the world’s natural resources (Gavin et al. 2010). In the developing world, conservation efforts are often hampered by unauthorized resource use, as the natural environment is the primary provider of food, shelter and income generation (Blomley et al. 2010). One way of reducing anthropogenic pressures on the environment is Integrated Conservation and Development (ICD). Various definitions have been given for ICD since it first arose in the 1980s (Blomley et al. 2010; Hughes & Flintan 2001), but the main aim is to achieve conservation and development goals simultaneously, through alleviating poverty to reduce dependence on the environment, and / or by sharing the profits of conservation with local communities to meet their developmental needs. The link between conservation and poverty alleviation was cemented in policy when the 10th Conference of Parties of the Convention of Biological Diversity encouraged parties to ‘support initiatives on the role of protected areas in poverty alleviation’ (Decision X31) in the 2011-2020 Strategic Plan (Baker et al. 2013).

Despite the promise of ICD, conservation and development goals are often conflicting (Campbell et al. 2010), and the promised ‘win-win’ solution has remained elusive (Archabald & Naughton-Treves 2001; Hughes & Flintan 2001). Two explanations for the widespread failure of ICD projects are that they offer the wrong incentive, or that the incentive is too little (Winkler 2011). However, an additional reason may be that the incentives do not reach the right people. Projects are often based on untested assumptions, such as that it is the poorest people who undertake unauthorized resource use (Blomley et al. 2010). As a result, ICD projects often do not benefit the people most in need, or target the people presenting the greatest threat to conservation. Without understanding the profiles and motivations of individuals engaged in unauthorized resource use, conservation and development goals cannot be aligned, and ICD is unlikely to succeed (Gavin et al. 2010).

With over 20 years of ICD projects but continuing resource extraction threatening biodiversity conservation, Bwindi Impenetrable National Park in southwestern
Uganda (hereafter Bwindi or the Park), provides an ideal case study in which to examine the profiles and motivations of resource users, as well as the successes and failures of ICD.

Bwindi was first declared a Forest Reserve in 1932, made a Game Reserve in 1961, and gazetted as a National Park in 1991. It protects a 330.8 km$^2$ fragment of afro-montane forest, home to around half the world’s population of Mountain gorillas (*Gorilla beringei beringei*) (Archabald & Naughton-Treves 2001) and is a refuge for the rare and endemic flora and fauna of the Albertine Rift. The Park is surrounded by one of the most densely populated regions of rural Africa, with over 300 people per km$^2$ in some localities (Ahebwa et al. 2012). It is also one of the poorest areas, where over 95% rely on subsistence farming for their livelihoods (Plumptre et al. 2004). With high levels of poverty and a scarcity of land, Bwindi has historically been harvested for both subsistence and income-generating purposes, creating friction between local communities and Park authorities (Baker et al. 2011; Plumptre et al. 2004).

ICD was first implemented at Bwindi in response to violent conflict which erupted following gazettement (Baker et al. 2011). In the mid 1990’s, the Multiple Use Programme (MUP) was established to allow certain community members, known as Authorised Resource Users (ARUs), access to forest resources in designated areas (Multiple Use Zones, MUZs) (Cunningham 1996). A series of ICD projects followed, and attitudes towards the Park and conservation improved (Blomley et al. 2010). However, despite shifting from resource use for commercial gain to primarily for subsistence, unauthorized activity remains (Blomley et al. 2010).

In 2012, the International Institute for Environment and Development (IIED) received a grant from the UK’s Darwin Initiative to fund a project titled “Research to Policy – Building Capacity for Conservation through Poverty Alleviation”, referred to as the CTPA project. The project’s aim is “to build knowledge and capacity of the Uganda Poverty and Conservation Learning Group (U-PCLG) to effectively influence conservation policy, decision-makers and practitioners at national and local levels.”
The research component of the project, led by the Institute of Tropical Forest Conservation (ITFC), is to better understand who is involved in unauthorized resource use and why, in order to improve the effectiveness of future interventions in terms of both conservation and development.

1.1 Project aims

As part of the CTPA project, this project aims to answer the following questions:

a) What are the socioeconomic profiles of people who extract resources from Bwindi, authorized or unauthorized?

b) What motivates unauthorized resource use?

c) What deters people from unauthorized resource use?

d) What is the best way to reduce unauthorized resource use in the future?

The focus of this research is unauthorized resource use, because compared to authorized activity, it presents a greater threat to conservation. The sustainability of the MUP has been investigated extensively, and is monitored by researchers from ITFC (Bitariho et al. 2006; Byarugaba et al. 2006; Muhwezi et al. 2009). Whilst the type and location of unauthorized resource use has been documented (e.g. Tukahirwa & Pomeroy 1993), there are only anecdotal accounts of who is involved and why, limiting the ability of the Park and ICD to prevent it.

To answer the research questions, the following hypotheses were tested:

a) Unauthorized resource use is undertaken by the poorest members of society

b) Subsistence is the primary driver of unauthorized resource use

c) Individuals are less likely to be involved in unauthorized activities if they perceive that they receive an equitable share of the benefits and fair compensation for the costs of conservation

d) Improvement of ICD will be more effective at reducing unauthorized resource use in the future than stricter law enforcement
These hypotheses are based on previous research conducted at Bwindi. Blomley et al. (2010) reported that it was the poorest households most commonly involved in unauthorized activity, primarily for subsistence. However, this information came from direct questioning of community members and law enforcement rangers, and could not be verified.

As illustrated in Figure 1.1, the underlying assumption of ICD at Bwindi is that people who receive benefits from ICD, or are compensated for the costs of conservation, become wealthier, reducing their dependence on forest resources, and therefore reducing unauthorized activity. Law enforcement, on the other hand, presents a cost to the household involved if they are caught and imprisoned or fined. This makes them poorer, potentially increasing their need for forest resources both to consume and to make money from.

1.2 Structure of thesis

This thesis will take the following structure. Chapter One (the current section) describes the aims and objectives of the study. Chapter Two will give an overview of the relevant literature and provide a background to ICD and resource use at Bwindi. Chapter Three will detail the methods used in this study. Chapter Four will describe the results gathered, and Chapter Five will explain them, providing answers to the questions stated above, whilst giving recommendations for future research, policy and ICD implementation.
Figure 1.1 – Conceptual framework of unauthorized resource use and ICD at Bwindi
2. Background

2.1 Resource use at Bwindi

Bwindi has supported human livelihoods for at least the past 2,000 years. The Batwa pygmies (singular Mutwa), now the ethnic group in the minority around Bwindi, are traditionally forest-dwelling hunter-gatherers from central Africa (Blomley 2003). A small population lived in and around the forest until it was gazetted as a National Park in 1991, when they were formally evicted and their traditional activities inside the forest were made illegal. The Batwa hunted bushmeat and collected wild honey, both of which they believe to have medicinal properties, to supplement their diet of wild fruits and roots. Once evicted, they became landless and struggled to support themselves (Blomley 2003).

The Bakiga are the dominant ethnic group around Bwindi. They are agri-pastoralists who have supported themselves with forest resources both for subsistence and small-scale commercial gain.

Hunting for bushmeat is one of the oldest activities in Bwindi (Namara 2000). Game meat is traditionally the only source of animal protein, especially for Bakiga women, for whom eating domestic meat was taboo (Namara 2000), although this no longer appears to be the case (personal observation). Hunted animals included buffalo (now locally extinct), bushbuck, duiker, bushpig, game birds such as guinea fowl and francolin, and occasionally small rodents and primates by the Batwa. In the five years prior to gazettement, over 3,000 items were confiscated from people found in the Park by the Game Department, the majority of which were snares, spears and pangas (Tukahirwa & Pomeroy 1993), indicating that poaching was prevalent.

The most common activity in the Park prior to gazettement, however, was pitsawing (Howard 1991; Tukahirwa & Pomeroy 1993), employing around 140 – 280 people in 1983 (Howard 1991). Pitsawing is the only method of felling and cutting timber practiced in Bwindi, sawn by hand, as the terrain does not allow for machinery. Gold
was also panned in a number of streams and rivers, employing 100 – 200 people in 1983 (Howard 1991). Other resources extracted included poles and bamboo for building, firewood, honey, plants for both medicine and for weaving baskets, trays and mats. It was estimated in the early 1980’s that 60 – 120 people were entering the forest each day (Howard 1991). These numbers represent a substantial proportion of potentially poor people generating income through livelihoods requiring low levels of education.

Shortly after gazettement, Tukahirwa & Pomeroy (1993) asked people to rank the resources they used to get from the Park in order of importance. Timber ranked number one overall, indicating that the primary motivation for resource use was to generate low-level income. Since Bwindi is surrounded by one of the poorest areas of Uganda, far from commercial centres or markets, the Park was vital to the local economy. Creation of the National Park meant that access to the Park by local people was prohibited, and law enforcement became stricter. The sudden loss of access and income led to violent conflict between local communities and the Park authorities (Baker et al. 2011).

2.2 Integrated Conservation and Development at Bwindi

ICD was initially introduced to improve relations between Park authorities and local communities. Since the early 1990’s, a variety of ICD projects have been implemented by both the Uganda Wildlife Authority (UWA), the government department responsible for managing protected areas, and non-governmental organisations (NGOs) working around the Park. The most notable NGOs are shown in Table 2.1.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Primary focus</th>
</tr>
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<tbody>
<tr>
<td>Institute for Tropical Forest Conservation (ITFC)</td>
<td>Ecological monitoring, monitoring of resource use, biodiversity assessment and inventories, applied ecological and socioeconomic research (since 1991)</td>
</tr>
<tr>
<td>Bwindi and Mgahinga Conservation Trust</td>
<td>Community development projects (rural</td>
</tr>
</tbody>
</table>
The Multiple Use Programme (MUP) was developed by UWA with support from CARE and ITFC in 1993, allowing people with permits (authorized resource users, ARUs) in certain parishes bordering the Park to harvest medicinal plants, honey and basketry materials from Multiple Use Zones (MUZs). The MUP has been successful in improving attitudes towards the Park, but directly benefits relatively few people (Blomley et al. 2010); only 667 people are currently listed as ARUs. Despite only 5% of the people interviewed by Blomley et al. (2010) benefitting directly from the MUP, a total of 60% felt that they benefitted in some way.

Tourism

Most tourists visit Bwindi to see the mountain gorillas. Tourists first started visiting habituated groups in 1993, and at time of writing there are eight groups available for viewing. UWA allows a maximum of eight tourists to visit each group at a time, allowing a total of 64 per day. Each visitor must purchase a permit, currently priced at 500 USD. To cater for these tourists, some NGOs have set up lodges around the Park, employing local people and investing the profits back into the community. Some local people are
also employed as porters for tourists, carrying their bags as they trek to and from the gorillas.

**Revenue Sharing**

The National Tourism Revenue Sharing Policy for all national parks was implemented in 1994, giving all communities neighbouring protected areas 12% of all Park income. In 1996, Uganda National Parks merged with the Game Department to become UWA, and in the Uganda Wildlife Statute of that year, revenue sharing policy changed to 20% of gate entrance fees. This change benefitted most of Uganda’s national parks, where income is generated primarily through entrance fees. However, the majority of Bwindi’s revenue is derived from the sale of gorilla tracking permits, which are limited to eight per gorilla group per day. As a result of the change in policy, between 1996 and 2009, only 9.3% of Bwindi’s tourism revenue was shared with local communities (Ahebwa et al. 2012).

To compensate for the decrease in revenue shared with communities around Bwindi, a gorilla levy was introduced after lobbying from IGCP and BMCT. In August 2005, the decision was made that 1% of the sale of every gorilla permit would be collected and divided amongst local people once every two years. Collection began in July 2006, and the first gorilla levy money was distributed in August 2009.

Revenue is shared in the form of projects proposed by the beneficiaries, such as road construction, schools, health centres and livestock. However, the process of revenue sharing at Bwindi has come under considerable criticism since it was established (Archabald & Naughton-Treves 2001; Ahebwa et al. 2012). There are problems of poor communication, complicated application processes and claims of corruption, resulting in unfair distribution both locally and nationally (Ahebwa et al. 2012).

**Crop raiding control**
Crop raiding has been an issue around Bwindi since at least the 1930’s, when gorillas were reported to disturb fields neighbouring the Park (Baker et al. 2013). A recent study found that 63% of people say that the Park employs no measures to protect people’s crops (Aharikundira & Tweheyo 2011). There have, however, been a number of studies on the extent of crop raiding (Baker 2004), and a few interventions implemented by both UWA and NGOs. For example, UWA initiated a project planting a living fence of Mauritius thorn (*Caesalpinia decapetala*) to keep animals out of people’s gardens, which was later expanded by BMCT (BMCT 2009). IGCP established Human-Gorilla Conflict Resolution (HUGO) groups, which voluntarily guard crops against raiding, whilst tea planting around the northern sector has provided an unintended buffer against animals which do not tend to pass through (Aharikundira & Tweheyo 2011).

Despite substantial investment in ICD, unauthorized activity continues, although at lower rates than before, evidenced by continuing arrests and signs of activity noted in the censuses of mountain gorillas (McNeilage et al. 2007). The failure of ICD to prevent unauthorized activity may be a result of projects benefitting the wrong people, i.e. those not involved in unauthorized activity. Whilst it is generally assumed that it is the poorest people involved in unauthorized activity, Blomley et al. (2010) found that many ICD projects around Bwindi tended to benefit the wealthier portion of communities disproportionately (Table 2.2)

**Table 2.2 - The proportion of people of different wealth who perceived themselves to benefit from different types of ICD** *(1 = wealthiest, 4 = poorest, adapted from Blomley et al. 2010)*

<table>
<thead>
<tr>
<th>Project</th>
<th>Percentage of wealth categories benefiting from ICD projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUP (n=570)</td>
<td>1  2  3  4</td>
</tr>
<tr>
<td>Tour (n=119)</td>
<td>45-50 35-40 25-30 15-20</td>
</tr>
<tr>
<td>Revenue sharing (n=422)</td>
<td>90-95 85-90 60-65 5-10</td>
</tr>
<tr>
<td>BMCT (n=572)</td>
<td>80-90 80-90 70-80 50-60</td>
</tr>
</tbody>
</table>
Until now, no research has confirmed that it is the poorest people continuing with unauthorized resource use at Bwindi. One of the reasons for this is that it is difficult to investigate.

2.3 Methods of investigating sensitive behavior

One of the challenges of targeting ICD is knowing who the people presenting the threats are (Nuno et al. 2013). The sensitive nature of unauthorized resource use means that levels of activity are often underreported (Gavin et al. 2010), and that the resources exploited and profiles of people involved are disproportionately estimated. Gavin et al. (2010) evaluated eight methods by which unauthorized resource use is investigated; law-enforcement records, indirect observation, self-reporting, direct observation, direct questioning, randomized response technique (RRT), forensics and modeling. They found that the accuracy of estimates of unauthorized activity varied between methods, and that different methods were suitable for different situations, depending on the time, expertise and budget available to the researchers, and the type of activity in question.

Whilst indirect questioning requires a large sample size and a level of expertise in survey design and implementation, it is one of the most reliable methods of estimating levels of illegal activity. It allows the interviewee to give an honest response, without revealing to the researcher whether or not they engage in a sensitive behavior. The RRT has been used to successfully investigate carnivore killing in South Africa (St John et al. 2012), bushmeat consumption in Madagascar (Razafimanahaka et al. 2012) and illegal activities at Kibale National Park in Uganda (Solomon et al. 2007). More recently, the Unmatched Count Technique (UCT) (Droitcour et al. 1991) has been applied to issues of conservation concern, such as killing of birds in Portugal (Fairbrass 2012) and bushmeat hunting in the Serengeti (Nuno et al. 2013), giving significantly higher estimates of illegal activities than direct questioning. Whereas researchers using RRT have reported that respondents feel discomfort with RRT because of associations with gambling, magic, or dishonesty (Razafimanahaka et al. 2012; Solomon et al. 2007), the majority of participants in UCT surveys have reported that it is easy to understand (65%) and that they did not feel uncomfortable at all (70%) (Nuno et al. 2013). The limitations of UCT, however, are that
it requires a large sample size, and is not effective at estimating the prevalence of behaviours involving a small proportion of the population.
3. Methods

3.1 Methodological Framework

Given the difficulties of quantifying unauthorized resource use, the research presented here uses a mixed methods approach to triangulate findings, to improve accuracy as recommended (Gavin et al. 2010). A household survey (hereafter referred to as the CTPA interview after the Conservation Through Poverty Alleviation project) was conducted to generate socioeconomic profiles of resource users. The survey combined direct observation with both direct and indirect questioning, using the Unmatched Count Technique (UCT) to estimate prevalence of unauthorized resource use.

Semi-structured interviews (SSIs) were held with members of staff of the Uganda Wildlife Authority (UWA), and focus group discussions (FGDs) were conducted with community representatives and Reformed Poachers Associations (RPAs). The purpose of the SSIs and FGDs was to provide qualitative confirmation of the quantitative conclusions drawn from the CTPA interview, and provide different perspectives on the motivations and deterrents of resource use, and opinions on the future of ICD at Bwindi.

3.2 CTPA interview

The CTPA interview was conducted with a selection of known and suspected resource users and random households. Known or suspected resource users, both authorized and unauthorized, were identified using UWA records. UWA’s list of authorized resource users (ARUs) was used to randomly select 50 active, ARUs. The Community Conservation Warden supplied a list of suspected bushmeat hunters, all 40 of whom were selected for interview. The Institute of Tropical Forest Conservation (ITFC) worked with Community Conservation Rangers (CCRs) to compile arrest records for 12 months, starting in August 2012. Information with which to re-identify each arrestee was recorded, along with the location and nature of the unauthorized activity. The 12 people arrested between September 2012 and April 2013 who were resident in a Ugandan parish neighbouring the Park were followed up and included in the survey. Arrestees resident in the
Democratic Republic of Congo (DRC), which borders the northwest edge of the Park, and tourists were not surveyed. The suspected bushmeat hunters and freshly arrested respondents were grouped together as unauthorized resource users (URUs). According to a recent review, this is the first time that arrest records have been used to generate profiles of known URUs (Gavin et al. 2010).

For comparative purposes, two households were selected from the same village (known as Local Council, LC) as each ARU and URU, using random numbers assigned to lists of names collected from LC chairmen. In addition, 50 random Batwa households were surveyed to ensure that minority views were heard. The number of interviews therefore totaled 356; 50 ARUs, 52 URUs, 204 random households, and 50 random Batwa households. A Microsoft Access database was designed for the CTPA project by Michelle Wieland, an independent consultant. Data were entered by ITFC staff. Analyses presented in this report were conducted on the 281 interviews entered by 10th August 2013, comprising 48 ARUs, 51 URUs (of which 13 were discovered to also be ARUs, so were reclassified as “Both”), and 182 random households, of which 28 were Batwa (Figure 3.1).

The CTPA interview was split into sections on household population, education, health, wealth, wellbeing, ICD projects, and UCT (Appendix I). Years of formal education of respondents was calculated from the level of education they claimed to have obtained. Respondents who gave unclear or imprecise responses were excluded from analyses involving education.

The health section was based on questions previously asked by Conservation Through Public Health (CTPH), an NGO working around Bwindi, to make results comparable with past and future surveys if necessary. Each respondent was assigned a sanitation score on a scale of 0 to 3, from the number of sanitation facilities they possessed.
Two different methods of measuring wealth were used; the Basic Necessities Survey (BNS) (Davies 2013), and direct observation of household indicators of wealth. Items for inclusion in the BNS were brainstormed by the researchers, most of whom are Ugandan and have lived and worked around Bwindi for many years. The items were then shared with local
residents for discussion and refined accordingly. Observable indicators of household wealth were discussed in focus groups with local community members lead by Julia Baker (CTPA project Research Advisor) and Medard Twinamatsiko (ITFC’s Head of Social Research). Based on these discussions, each interviewee’s homestead was given a score based on the structural composition of the house, kitchen and latrine walls, roof and size and presence/absence of a water tank.

The BNS scores were heavily skewed, with over half the respondents scoring 0.9 or above, and more than a third scoring the maximum of 1.0. BNS score was therefore categorized as shown in Table 3.1:

<table>
<thead>
<tr>
<th>Basic Necessities Score Category</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ≤ BNS &lt; 0.85</td>
<td>79</td>
</tr>
<tr>
<td>0.85 ≤ BNS &lt; 1.0</td>
<td>98</td>
</tr>
<tr>
<td>BNS = 1.0</td>
<td>104</td>
</tr>
</tbody>
</table>

The observational wealth score was normally distributed, and was positively correlated with the BNS (Kendall’s tau = 0.128, p = 0.009), showing that both estimations of wealth were consistent. Results presented here used the observed score as a measure of wealth. An additional estimator of wealth used was hunger, with responses grouped into two classes; “No, I never go hungry” and “Yes, I sometimes go hungry.” Wellbeing was surveyed by asking respondents to rate their life on a scale of 1 to 5, where 1 is the worst it could be and 5 is the best. Responses all fell between 1 and 3. To obtain local perceptions about how lives and Park management could be improved, respondents were also asked what they would do if they were Park manager.

Knowledge of and perception of ICD projects was surveyed by asking respondents to list all the projects they were aware of. For each project they knew, they were asked what impact the project had had on them (Bad, No change, Benefit), how involved in the design and implementation they had been, and what sense of ownership they felt over
the project (None, A little, Some, A lot). For analysis, each respondent was given three scores. The first was the number of ICD projects that they perceived themselves to have benefitted from. To calculate involvement and ownership scores, responses were given a numerical value (None = 1, A little = 2, Some = 3, A lot = 4). Each respondent’s involvement or ownership score was then the sum of their involvement or ownership responses.

The UCT questions were designed to establish the prevalence of extraction of the following resources, suggested to be the most commonly collected (S. Asuma, personal communication); medicinal plants, wild honey, firewood, bushmeat and building poles. For each resource, interviewees were offered two cards facing down (one control and one treatment) and asked to pick one at random without seeing what each displayed. Interviewees were asked “How many of the places shown on the card have you obtained [medical treatment / honey / energy for cooking / meat / building materials] from in the past year?”

The control cards showed four photographs of potential sources of each resource, including one that everybody was expected to include and one that almost nobody would use, to avoid the loss of confidentiality that would occur if either all or none of the photographs were counted. The treatment cards showed the same four photographs with an additional photograph of the resource extracted from the Park. The photograph of the Park was randomly positioned on each card. In addition to the photos, the cards had an explanation of each photograph written in both English and the local language, Rukiga, and the photographs were explained to each respondent before they answered, to account for illiteracy (Appendix II).

To prepare the respondent for the UCT questions and identify any misunderstandings in the methodology, a trial question about crop raiding was asked before any of the questions about forest resources. After the method was explained to the interviewee, they were asked to select a card then answer the question “How many of these animals have your crops been raided by in the past year?”
Items for inclusion on all cards were selected by the author following discussions with Stephen Asuma, Uganda Country Co-ordinator for IGCP who has worked closely with communities around Bwindi for the past 15 years. He could therefore advise the alternative sources of forest resources that local people were likely (and unlikely) to utilize. Before implementation, the items were reviewed and revised where necessary by the field team.

The UCT data was used to estimate the proportion of the surveyed population utilizing each forest resource using the following calculation:

\[ \hat{\pi} = \bar{x}_1 - \bar{x}_0 \]

where \( \bar{x}_1 \) and \( \bar{x}_0 \) are the means of the counts given from the treatment and control cards respectively. Welch’s t-test was used to calculate the standard error of the estimates, since the error variance of each mean was unlikely to be equal.

The shortest distance from each household to the Park boundary was calculated in ArcGIS.

The CTPA interview was piloted in mid-April 2013 on 15 people in four villages (10 Bakiga and five Batwa). Although the interview was long (averaging 2 hours), participants reportedly remained engaged due to the ‘fun’ sections (BNS and UCT) that used photographs. Following feedback from the pilot, changes were made to the questionnaire, including items on UCT cards that were easily mistaken.

The interviews were held in Rukiga by field assistants from ITFC trained in social research techniques, with free, prior and informed consent. Non-Batwa respondents were given a bar of soap and two packets of salt for their time, whilst Batwa respondents were given a kilo of posho and a kilo of beans, in line with ITFC protocol.

3.3 Focus Group Discussions with Stretcher Groups
Stretcher groups are informal governance institutions, usually comprised of members of the same clan living in the same locality (Katabarwa 1999). The original purpose of the stretcher group is to provide assistance when a member is sick, by carrying them to hospital or the nearest road on a traditional stretcher woven from plant materials gathered from the forest. If somebody dies, the group provides firewood for the funeral pyre, money to assist with costs, and food to cater for the visiting mourners. Some stretcher groups have expanded their activities to include income-generating projects, small loan schemes and other developmental activities, (C. Byaruhanga, personal communication).

Stretcher groups were chosen as targets for FGDs because they also have constitutions and by-laws with which to govern their members. They regularly review their moral code for their community and provide guidance and advice as to how to behave. Some groups impose fines and punishments on members who disobey (Katabarwa 1999), so were considered to be well placed to give information regarding unauthorized activity.

Stretcher groups were selected in parishes and villages where a high number of CTPA interviews were being conducted, so that comparisons could be made where necessary between the qualitative information collected in the discussions and the quantitative data derived from the interviews. Parishes were also selected to provide variation across the following variables: presence/absence of habituated gorillas for tourism, participation in the Multiple Use Programme (MUP), and number of ARUs and URUs. In total, 17 FGDs were held in eight parishes (Table 3.2)

Within each parish, the villages with the highest numbers of CTPA interviewees were selected for focus groups. The LC chairman was contacted by phone to identify the names and contact details of the stretcher groups in each selected LC, from which one was randomly selected. In areas where there are Batwa communities, focus groups were held with both a Batwa and a Bakiga stretcher group from the same locality, to allow for comparisons where all other factors are relatively constant.
The stretcher group chairman was phoned in advance and asked to assemble a group of between six and 10 people ranging in age and gender from his stretcher group, preferably including himself, the vice chairperson, secretary, treasurer, chairperson for women, an old man, an old woman, and youths of both genders. The location was arranged in advance to be somewhere enclosed, private and relatively quiet, to prevent distractions or interruptions. The chairman was not informed that a *mzungu* (white person) would be leading the discussion, just that researchers from ITFC would be present, so as not to raise the expectations of the participants or gather more members than were required.

FGDs with stretcher groups were based around four main questions (Appendix III).

- What do you think motivates members of your community to extract resources from the Park, with or without permission?
- What do you think deters people from extracting resources from the Park?
- What do you think would improve the lives of people in your community?
- What do you think would improve the protection of the Park, or reduce threats?

Discussions were led by the author and facilitated by Christopher Byaruhanga, a field assistant from ITFC fluent in both English and Rukiga and trained in social research techniques. Motivations and deterrents were written on pieces of paper in both English and Rukiga and ranked in order of which motivates or deters the most people in their community (Figure 3.2).

Audio recordings were made of FGDs with the participants’ permission. Additional translations were made from the recordings with the assistance of Christopher Byaruhanga.
<table>
<thead>
<tr>
<th>Parish</th>
<th>LC</th>
<th>Stretcher Group</th>
<th>Ethnicity</th>
<th>Gorilla tourism</th>
<th>MUP</th>
<th>No. URUs Parish LC</th>
<th>No. ARUs Parish LC</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bujengwe</td>
<td>Byumba</td>
<td>Byumba Batwa</td>
<td>Batwa</td>
<td>No</td>
<td>No</td>
<td>5</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>Bujengwe</td>
<td>Mayanja</td>
<td>Murenge</td>
<td>Bakiga</td>
<td>No</td>
<td>No</td>
<td>5</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>Buremba</td>
<td>Hakikome</td>
<td>Hamushojo</td>
<td>Bakiga</td>
<td>No</td>
<td>No</td>
<td>5</td>
<td>4</td>
<td>38</td>
</tr>
<tr>
<td>Buremba</td>
<td>Hakikiome</td>
<td>Hamutumba</td>
<td>Batwa</td>
<td>No</td>
<td>No</td>
<td>5</td>
<td>4</td>
<td>38</td>
</tr>
<tr>
<td>Kashasha</td>
<td>Kagogo</td>
<td>Mashoho</td>
<td>Bakiga</td>
<td>No</td>
<td>Yes</td>
<td>17</td>
<td>8</td>
<td>165</td>
</tr>
<tr>
<td>Kashasha</td>
<td>Kagogo</td>
<td>Habitebe</td>
<td>Bakiga</td>
<td>No</td>
<td>Yes</td>
<td>17</td>
<td>8</td>
<td>165</td>
</tr>
<tr>
<td>Kashasha</td>
<td>Kiriba B</td>
<td>Butumbe</td>
<td>Bakiga</td>
<td>No</td>
<td>Yes</td>
<td>17</td>
<td>2</td>
<td>165</td>
</tr>
<tr>
<td>Kashasha</td>
<td>Ndego</td>
<td>Hamubare A</td>
<td>Bakiga</td>
<td>No</td>
<td>Yes</td>
<td>17</td>
<td>6</td>
<td>165</td>
</tr>
<tr>
<td>Kitojo</td>
<td>Katoma</td>
<td>Kiriba</td>
<td>Bakiga</td>
<td>Yes</td>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>77</td>
</tr>
<tr>
<td>Kitojo</td>
<td>Ruhija</td>
<td>Ruhija Canteen</td>
<td>Bakiga</td>
<td>Yes</td>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>77</td>
</tr>
<tr>
<td>Mpungu</td>
<td>Murushasha</td>
<td>Kinyangaji B</td>
<td>Bakiga</td>
<td>No</td>
<td>Yes</td>
<td>1</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>Mukono</td>
<td>Mukono</td>
<td>Mukono A</td>
<td>Bakiga</td>
<td>Yes</td>
<td>No</td>
<td>13</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>Mukono</td>
<td>Nkwenda</td>
<td>Nkwenda A</td>
<td>Bakiga</td>
<td>Yes</td>
<td>No</td>
<td>13</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>Mushanje</td>
<td>Bigandu</td>
<td>Bigandu B</td>
<td>Bakiga</td>
<td>No</td>
<td>Yes</td>
<td>2</td>
<td>1</td>
<td>55</td>
</tr>
<tr>
<td>Mushanje</td>
<td>Kinyungu</td>
<td>Habubare</td>
<td>Bakiga</td>
<td>No</td>
<td>Yes</td>
<td>2</td>
<td>1</td>
<td>55</td>
</tr>
<tr>
<td>Rubuguri</td>
<td>Rushaga</td>
<td>Bubaare Batwa</td>
<td>Batwa</td>
<td>Yes</td>
<td>No</td>
<td>1</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>Rubuguri</td>
<td>Rushaga</td>
<td>Rwatemtembe</td>
<td>Bakiga</td>
<td>Yes</td>
<td>No</td>
<td>1</td>
<td>1</td>
<td>NA</td>
</tr>
</tbody>
</table>

LC = Local Council (Village level), MUP = Multiple Use Programme, URU = Unauthorised Resource User, ARU = Authorised Resource Use
Within each FGD, each motivation and deterrent for unauthorized resource use was given a salience score (Papworth et al. 2013) using the following formula:

$$Salience \ (S) = \frac{1 + length_i - position_i}{length_i}$$

where \( length \) is the number of motivations or deterrents given by focus group \( i \), and \( position \) is the rank given to that motivation or deterrent. The cultural salience for each motivation and deterrent was calculated using the following formula:

$$Cultural \ salience = \frac{\sum salience_i}{n}$$

where \( n \) is the number of focus groups. Ways to improve peoples’ lives and reduce threats to the Park were ranked according to the number of times each code was mentioned overall.
Each focus group was given 25,000 UGX to divide as they chose between the group, to compensate for their time and travel expenses.

3.4 Focus Group Discussions with Reformed Poachers Associations

At the time of survey, there were three Reformed Poachers Associations (RPAs) around Bwindi, in the parishes of Mpungu, Kiyebe and Rubuguri (Table 3.3). FGDs were held with members of each one. The RPA’s were established with the assistance of a CCR, with a poaching equipment amnesty following a short period of sensitisation. The CCR provided the contact details of each group’s Chairman. The Chairman of each group was contacted by phone or in person one to three days prior to the planned meeting and asked to organise between six and 10 members of the association ranging in age and background to meet in a enclosed, quiet place for a discussion with researchers from ITFC.

Table 3.3 Characteristics of Reformed Poachers Associations

<table>
<thead>
<tr>
<th>Name</th>
<th>Established</th>
<th>Current Members</th>
<th>Activity</th>
<th>FGD Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mpungu RPA</td>
<td>2004</td>
<td>97</td>
<td>Active</td>
<td>11</td>
</tr>
<tr>
<td>Kiyebe RPA</td>
<td>2007</td>
<td>32</td>
<td>Inactive</td>
<td>9</td>
</tr>
<tr>
<td>Rubuguri RPA</td>
<td>2010</td>
<td>56</td>
<td>Active</td>
<td>14</td>
</tr>
</tbody>
</table>

RPA = Reformed Poachers Association, FGD = Focus Group Discussion

Discussions with the RPAs were based around the following questions (Appendix IV):

- Why did you hand in your poaching equipment and join this group?
- What used to make you hunt, before you joined this group?
- From these reasons, why do some people still hunt? Are there any other additional reasons?
- Why don’t other hunters in your community join this group too?
- Do you think you made the right decision joining this group, or do you sometimes wish that you couldn’t and could still hunt? Why?
• If you were leaders in UWA or government, what would you do with the Reformed Poachers Associations to make them work best for the reformed poacher and for the wildlife in the forest?

The answers to the first two questions were ranked in the same way as the motivations and deterrents in FGDs with stretcher groups. Discussions were recorded with permission of participants and analysed in the same way as FGDs with stretcher groups. Each group was collectively given 25,000 UGX.

3.5 Semi-Structured Interviews with UWA staff

Informal, semi-structured interviews (SSIs) were held with UWA staff, namely the CCRs based at each Ranger Outpost around the Park, the Community Conservation Warden and the Law Enforcement Warden for Bwindi. The aim was to obtain the views and perceptions of Park authorities regarding motivations and deterrents for resource use, and options for future management, to compare with those of local communities. Six interviews were held between 30th and 31st May 2013 and were based around the following three questions:

• What do you think causes people to undertake unauthorized resource extraction?
• What do you think deters people from unauthorized resource use?
• What do you think is the best way to reduce unauthorized activity in the Park in the future?

Responses were coded and the various motivations and deterrents ranked according to how many times they were mentioned by interviewees.
4. Results

The results are presented in the following order. Firstly, the socioeconomic characteristics of the surveyed population are examined, including the influence of ICD projects and proximity to the Park on poverty (section 4.1), to better understand the potential drivers of resource use. Secondly, the socioeconomic profiles of resource users (authorized, unauthorized or both) are compared to the random households and to each other (section 4.2). Thirdly, the resources extracted from the Park are explained in order of estimated frequency of collection, and the motivations for their utilization are described (section 4.3). This section is followed by an explanation of the overarching motivations influencing the extraction of all resources (section 4.4), followed by a description of the deterrents (section 4.5). The results end with an overview of the options suggested for future management of the Park and ICD (section 4.6).

4.1 Poverty and the Park; the socioeconomics of the study population

The relationships between socioeconomic characteristics and the influence of the Park and ICD, described as follows, are illustrated in Figure 4.1. (All statistics detailed in Appendix V).

Older respondents (aged over 60) had significantly fewer years of formal education. Formal education was positively correlated with observed wealth, sanitation, involvement in ICD, and negatively correlated with the number of children respondents wanted to have. Observed wealth was positively correlated with respondent’s number of children, sanitation, and involvement in ICD, ownership of ICD and perceived benefits. Wealthier are less likely to go hungry, and are more likely to live within an hour of a road or trading center.
People who rated their life “worst” had significantly fewer years of education, lower observed wealth, perceived themselves to receive fewer benefits from ICD, be less involved and have less ownership than people who rated their life “average” (Figure 4.2). People who have been more involved in ICD perceive themselves to benefitted from more projects, and feel more ownership over them.
People living within 0.5 km of the Park boundary have significantly lower observed wealth scores. However, it is the people living between 0.5 and 1 km of the Park boundary who have the highest ICD involvement, ownership and benefit scores (Figure 4.3).
Figure 4.3 – Influence of proximity to the Park on observed wealth, ICD benefits, involvement and ownership
4.2 Socioeconomic profiles of resource users

Unauthorised resource users (URUs) are more likely to live over an hour from the nearest trading centre (chi-sq = 9.24, p = 0.026, Figure 4.4).

![Proportion of resource users living within or over an hour from the nearest trading center]

Figure 4.4 – Proportion of resource users living within or over an hour from the nearest trading center

Authorized resource users’ (ARUs) households are significantly wealthier than random households, have better sanitation, perceive themselves to be more involved in ICD and to have received more benefits. All resource users (ARUs, Both and URUs) come from larger households and have more children than random households. URUs live closer to the Park boundary than others, although not significantly (Figure 4.5, Statistics in Appendix VI).

No other variables measured differed significantly between the different groups.
Figure 4.5 - Socioeconomic characteristics of different types of resource users
4.3 *Resource specific profiles and motivations*

The resource most commonly extracted from the Park is bushmeat, followed by medicinal plants, firewood, honey, and plant materials for weaving crafts. A number of other resources, including timber and timber products, gold, fish, and fruits are also extracted on a small scale.

4.3.1 *Bushmeat*

From the UCT data, it is estimated that 35.6% of the survey sample had obtained bushmeat in the past year (95% CI: 17.3 – 54.0%, \(t = -3.83, df = 275, p < 0.001\)). This estimation cannot be extrapolated to the population living around Bwindi, as the survey sample is unlikely to be representative of the true population, containing a higher proportion of known or suspected URUs. However, as ‘hunting meat for food’ received the highest salience score (0.629, Table 4.1) in FGDs with stretcher groups and was mentioned in all six SSIs with UWA staff, it is highly likely to be the most commonly extracted resource.

*Table 4.1 - Motivations for bushmeat hunting*

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Stretcher Groups</th>
<th>RPAs</th>
<th>UWA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hunt meat for food</td>
<td>16</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>To make money</td>
<td>8</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Driven by evil spirits</td>
<td>6</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Bushmeat is medicinal</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

RPAs = Reformed Poachers Associations, UWA = Uganda Wildlife Authority, \(n\) = number of groups / individuals, \(S\) = salience

Meat is hunted primarily for subsistence, because households lack their own livestock to eat, or the money to buy meat from the local butcher. As stated by four FGDs, three of which were Batwa groups, and three UWA staff, meat is an important
source of protein in the diet, and is sought to prevent or treat Kwashiorkor (acute childhood protein-energy malnutrition).

Whilst there is a small bushmeat trade, it tends to be sold only when there is more than the household can consume, rather than hunted purely to make money. Bushmeat is sold for between 3,000 and 8,000 UGX kg$^{-1}$, and is cheaper than meat from the local butcher (between 8,000 and 9,000 UGX kg$^{-1}$). Prices were higher in Kashaasha, the parish with the highest number of known or suspected URUs, where it seemed in FGDs that poaching was more socially acceptable. FGDs in Rubuguri, however, a parish with just one URU, gave low prices for bushmeat, stating that this was because it was illegal, and if you tried to charge too much then you would be reported. Money from the sale of bushmeat (as well as timber and baskets) is used to pay for school fees (five FGDs, one SSI) or to provide income after a person’s crops have been raided (six FGDs).

A reasonably commonly mentioned but low-ranked driver of bushmeat hunting was evil spirits or demonic forces. A CCR said that even somebody who is relatively wealthy and can afford to buy meat may find himself poaching in the forest, unable to explain why except to say that he is being forced to go by something he does not understand. On the other hand, the Batwa provided an explanation:

“We go there because of our ancestral spirits. Appeasing them depends on bushmeat, so when we don’t go there, these evil spirits then turn against us.” – Mutwa man, Hamutumba stretcher group, Hakikome

Another motivation for hunting bushmeat was for medicine. Wild meat, and duiker in particular, is believed to have medicinal properties because the animals eat the medicinal herbs in the forest. It is also thought to be more nutritious than domestic meat, so is better at curing malnutrition. The Batwa dry the intestines of duiker to add to food as medicine and to pass on traditional knowledge:
“When a Mutwa child feeds on the intestines of a duiker, he gets knowledge.” Mutwa man – Hamutumba stretcher group, Hakikome

The Kiyebe RPA mentioned that the skins of animals such as the Giant Forest Hog (*Hylochoerus meinertzhageni*) used to be sold to make money, and that the horns of animals like the sitatunga (*Tragelaphus spekii*) and bushbuck (*T. scriptus*) were used to make trumpets. However, this practice no longer continues.

The Mpungu RPA suggested that other members of their community continued to poach to tarnish the names of those who had reformed. All three RPAs stated that other poachers in their community did not reform because they saw no benefit of doing so:

> “Something that does not benefit you is a waste of time to join. It is better to spend time hunting in the forest. At least then you get meat as a benefit.” Mpungu RPA

> “Now I am reformed but I have seen no benefit, so now at times I wish I could still hunt. If I had known that the situation would be like this, then I would not have reformed. [...] When we meet other people who still hunt, we are taunted. Poachers say, “I have free meat. You are reformed, but what have you got? Nothing!” Mpungu RPA

4.3.2 Firewood

After bushmeat, the second resource most commonly mentioned resource was firewood (16 FGDs, $S = 0.478$), which is extracted from the forest because there is insufficient land on which to plant trees. No other reasons were given for unauthorized collection of firewood. From the UCT data, it was estimated that 22.5\% of the survey respondents had used firewood from the Park as fuel in the past year ($95\% \text{ CI} = 3.42 – 41.5\%$, $t = -2.32$. $df = 275$, $p = 0.021$).
The prevalence of firewood collection is 51% higher in households further from roads ($t = 2.18, p = 0.030$) and 62% higher in households further from trading centres ($t = 2.63, p = 0.009$, Figure 4.6). This could be because households further from roads and centers had lower observed wealth scores (section 4.2) so cannot afford their own trees or to buy firewood. However, the prevalence of firewood collection did not vary significantly in households of different wealth.

Figure 4.6 – Number of sources of fuel used by people near and far from roads and trading centers; the difference between the Control and Treatment means indicates the proportion of people using firewood from the Park.
4.3.3 Medicinal plants

The third most commonly mentioned resource in focus groups was medicinal plants, usually because herbal medicine cures with greater efficiency than modern medicine, and the plants are only found inside the Park (Table 4.2). However, the UCT prevalence estimate of using medicinal plants as medical treatment was not significant (estimate = 0.112, SE = 0.210, t = -1.05, df = 276, p = 0.294).

Table 4.2 - Motivations for extracting medicinal plants

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Stretcher Groups</th>
<th>UWA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (17)</td>
<td>S</td>
</tr>
<tr>
<td>Medicinal plants cure better than modern medicine</td>
<td>11</td>
<td>0.482</td>
</tr>
<tr>
<td>Medicinal plants are only found in the Park</td>
<td>10</td>
<td>0.403</td>
</tr>
<tr>
<td>Modern facilities are too far away</td>
<td>2</td>
<td>0.051</td>
</tr>
<tr>
<td>Service at the health clinic is too slow</td>
<td>1</td>
<td>0.041</td>
</tr>
<tr>
<td>Modern healthcare is too expensive</td>
<td>1</td>
<td>0.017</td>
</tr>
</tbody>
</table>

UWA = Uganda Wildlife Authority staff, n = Number of groups / individuals, S = salience

The plant most commonly mentioned in focus groups was the shrub *Rytiginia kigeziensis*, which is used to treat worms.

4.3.4 Honey

The next most popular resource was honey, consumed by 15.1% of the population (95% CI: 0.0 – 30.8%, t = -1.88, df = 261, p = 0.061). Focus groups reported that honey is collected in three ways; from wild nests in trees, stingless bees honey from the ground, and by maintaining beehives in the forest. Honey was reported to be valuable as both food and medicine, used to treat coughs and chest problems, and sells for around 10,000 UGX kg\(^{-2}\). It is therefore more commonly collected to make money than for household consumption (S = 0.342 and 0.276 respectively), although any that is collected to sell will also be used in the household, and vice versa.
Focus groups suggested that people prefer to place their hives in the forest as opposed to on their own land for two reasons. Firstly, there is insufficient land to keep bees as well as graze livestock or grow crops, and secondly, it is widely believed that hives kept in the forest will produce better quality and quantity of honey, as the bees have a greater variety of plants to gather pollen from.

4.3.5 Craft materials

Basketry and weaving materials were the next most commonly and highly ranked forest resource. The two most heavily utilized plant species are *Smilax anceps*, which is part of the MUP, and *Loeseneriella apocynoides*, which is not. Both are collected, with and without authorization, to weave baskets, trays, and stretchers, for household use and for sale ($S = 0.233$ and $0.237$ respectively). The same materials are used less commonly to weave beehives and granaries. When sold, baskets and trays are worth between 5,000 and 7,000 UGX, depending on the quality. A stretcher is not usually sold, but is worth around 100,000 UGX.

Sedges, *Cyperus papyrus* and *C. latifolius*, are also collected to weave mats from, for use in the home and for sale ($S = 0.164$ and $0.112$ respectively). Mats are worth between 5,000 and 20,000 UGX, depending on size, quality and location, and are used for sleeping on in the home or resting on at a funeral.

4.3.6 Less commonly extracted resources

Four other groups of resources were mentioned in FGDs with stretcher groups, but less frequently; timber and timber products, building materials, gold, and forest foods (Table 4.3).
Table 4.3 – Less commonly extracted resources and motivations

<table>
<thead>
<tr>
<th>Resource and motivation</th>
<th>Stretcher Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pitsawing timber for money</td>
<td>n (17)</td>
</tr>
<tr>
<td>Poles for building</td>
<td>8</td>
</tr>
<tr>
<td>Wood to carve handcrafts to sell to tourists</td>
<td>2</td>
</tr>
<tr>
<td>Fish for household consumption</td>
<td>4</td>
</tr>
<tr>
<td>Mine gold for money</td>
<td>4</td>
</tr>
<tr>
<td>Hoe handles for household use</td>
<td>3</td>
</tr>
<tr>
<td>Vines for building with</td>
<td>1</td>
</tr>
<tr>
<td>Bean stakes for personal use</td>
<td>2</td>
</tr>
<tr>
<td>Fish to sell</td>
<td>1</td>
</tr>
<tr>
<td>Panga handles for personal use</td>
<td>1</td>
</tr>
</tbody>
</table>

n = Number of groups, S = Salience

Timber is reportedly sold to make money to pay for school fees and other needs, but by relatively few people. It is time-consuming and easily detectable, so pitsawyers face a high likelihood of getting caught. According to stretcher groups, planks are sold for between 3,500 and 15,000 UGX per plank, depending on size and species of tree.

Around Buhoma, wood is also collected from the Park to carve into handcrafts to be sold to tourists. Forest tree species are used to make hoe and panga handles because they have much harder and stronger wood than the eucalyptus or pine planted on community land, so make better tools. Bean stakes are also occasionally collected from the forest, because they are unavailable elsewhere.

Only three focus groups mentioned extraction of building poles, which confirms the conclusion from the UCT data that too few people extract building poles to be able to estimate their number (estimate = 0.115, SE = 0.152, t = -1.481, df = 265, p = 0.140). One FGD mentioned that vines growing in the forest were also used in building.
Four groups mentioned gold mining, which still occurs in rivers in the centre and south of the Park to generate income. A piece of gold the weight of a matchstick is sold to traders operating in communities for 20,000 UGX.

According to all four stretcher groups that mentioned them, fish are caught mostly for their nutritious value. Forest foods including fruits (species unknown), _Dioscorea_ sp. (wild yam) and _Solanum nigrum_, which was said to be good for mothers who are breast feeding, were also mentioned as infrequently collected resources.

### 4.4 Overarching Motivations

In addition to the resource specific motivations detailed above, there are overarching drivers which influence all resource extraction; the problems of crop raiding, poor management of revenue sharing and lack of employment for local people, and belief in traditional rights.

#### 4.4.1 Crop raiding

According to stretcher groups, when animals from the Park raid a person’s crops, they lose not only their food, but also the means to make money to buy more or cover other costs.

> “Crop raiding is a serious problem. People’s crops are raided, so then there is no harvest to take home, so now there is no food at home people are forced to go and cut timber, so that they can make money, and then they can buy food.” – Man, Hamushojo stretcher group, Hakikome

The perceived lack of compensation or assistance from the Park authorities angers local people, who then see little problem with compensating themselves with resources illicitly collected from the forest. Anger at crop raiding was the 5th most important driver of unauthorized resource use mentioned in FGDs with stretcher
groups (S = 0.372), and was the 3rd most important reason members of the Kiyebe RPA used to poach:

“... the present management is not controlling the problem of crop raiding animals, scaring them or killing them, which makes people angry so they go into the forest.” - Hamushojo stretcher group, Hakikome

The lack of money caused by crop raiding also ranked highly as a motivation (S = 0.252, ranked 2nd by Mpungu RPA).

4.4.2 Inequity of revenue sharing

Revenue sharing has the potential to indirectly provide the compensation for crop raiding that people desire, but currently fails to do so. Local people claim that the money intended for communities is ‘lost’ through corruption at the district and sub-county levels before it is distributed (five FGDs):

“People are angered by corruption in revenue sharing. The intended money doesn’t reach people. It is eaten at the sub-county level.” — Kinyangaji B stretcher group, Murushasha

When the remaining revenue arrives, it goes to people related to members of local government, those who have received benefits before, or those who live far from the Park boundary and have never suffered from crop raiding (three FGDs).

“It [revenue sharing] is not benefitting local communities. You find that those who benefitted last year are benefitting again this year. Those near the Park are not considered.” - Habitebe stretcher group, Kagogo

The most common way in which revenue is shared is through distribution of goats. However, according to focus groups, a goat that is supposed to be worth 120,000
UGX arrives sick and thin, and worth only 60,000 UGX. Goats often die soon after delivery, leaving recipients disappointed.

Anger at corruption in the revenue sharing process was ranked as a motivation for unauthorized resource use in four FGDs with stretcher groups (S = 0.130). Anger at the revenue being shared with the ‘wrong’ people was included by two groups (S = 0.080).

4.4.3 Lack of employment

There is a common belief amongst local communities, mentioned in 12 FGDs, that the Park gives employment preferentially to people from distant areas of the country, and / or to people who are related to influential members of UWA. Anger at this situation, whether real, justifiable or just perceived, was the 14th most important driver of unauthorized resource use (S = 0.205). The 15th most important driver was the lack of income caused by lack of employment (S = 0.204); people make money from the Park illicitly instead of through formal employment.

“The Park is employing people from very far away who are not the owners of the forest and the forest is not near their homes. Then we are forced to go there because we are near the park and we are not employed.” – Mutwa, Hamutumba stretcher group, Hakikome

Local people find the employment situation particularly frustrating when the new rangers know very little about forests, or do not speak the local language so cannot communicate. In southern parts of the Park, some ARUs have stopped harvesting honey from their hives in the Multiple Use Zones (MUZ), because they were falsely arrested when the rangers came across them in the Park and did not understand that they were allowed to be there:

“Now that the Park has employed rangers from northern Uganda, they don’t speak Rukiga. People fear to go because the rangers don’t speak
our language, so they fear that if they are there collecting honey from their beehives then they might be arrested. When he [a Ranger] finds you there, you explain in Rukiga but he does not understand, so it is a problem.” – Mashoho stretcher group, Kagogo

4.4.4 Culture and traditional rights

A relatively minor and non-resource specific driver of resource use is the cultural belief that the forest resources belong to local people and that they have, or had, a right to extract them (two RPAs). According to UWA staff, this is more commonly a driver for the Batwa. Cultural motivations were more commonly mentioned by Batwa stretcher groups, for example entering the Park to visit hot springs (S = 0.053), believed to have healing properties, or sites of ancestral worship (S = 0.018).

4.5 Deterrents

The most commonly mentioned deterrents against unauthorized resource use are displayed in Table 4.4. Explanations of deterrents in order of importance follow.

<table>
<thead>
<tr>
<th>Deterrent</th>
<th>Stretcher Groups</th>
<th>RPAs</th>
<th>UWA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Law enforcement</td>
<td>17</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Sensitisation</td>
<td>10</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Influence of family</td>
<td>13</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Influence of stretcher group</td>
<td>14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Influence of community</td>
<td>12</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Benefit – schools</td>
<td>11</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Revenue sharing – goats</td>
<td>7</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hope for future benefits</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Benefit – health clinics</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
Fear of arrest, fines, and even death, is the greatest overall deterrent against unauthorized resource use, and the second most important reason that members of RPAs gave up hunting.

The second most important deterrent was sensitization and conservation education. Most communities understood the importance of the Park in terms of conservation of rare species and habitats, and the benefits it provides, both environmental and economic. Six stretcher groups listed ‘the forest brings rain’ as a deterrent (S = 0.288), and five included ‘climate stabilization and oxygen provision’ (S = 0.166). Five groups also mentioned that people no longer undertook unauthorized activities in the Park because of the rare mountain gorillas (S = 0.236), which they did not want to harm because tourists paid money to come and see them, which contributes to both the local (eight FGDs, S = 0.341) and national (seven FGDs, S = 0.303) economy. Awareness of gorillas and the income they generate was no higher in parishes with gorilla tourism than those without.

Social influence was the next most important deterrent. The influence of family is closely linked to law enforcement. Members of FGDs stated that families discourage their members from unauthorized activity, because if they are caught, they will have to pay a large fine which they cannot afford and will end up having to sell their property.
Stretcher groups will fine members who extract resources from the forest without permission, or report them to the police. In poorer communities where people cannot afford to pay the fine (most commonly a jerry can of local brew), stretcher groups simply discipline offenders orally and educate them on the importance of the Park.

The wider community also deters people from unauthorized activity, although to a lesser extent than families or stretcher groups. Focus groups and one SSI reported that people do not want their reputations damaged, particularly if they hold positions of power or influence such as a teacher or representative of the community. One member of a RPA claimed to have left poaching because he became a local leader and wanted to be a good influence on his community. However, there was no significant difference between the proportions of each resource user group (ARU, URU, both, and random households) who did or did not hold a position of power or influence in their community (chi-sq = 3.479, df = 3, p = 0.324).

Benefits from ICD and the Park were the next most important group of deterrents. The hope of receiving benefits in the future was ranked higher than most actual benefits. This was also one of the primary reasons that members gave for joining the RPAs; they expected to receive a benefit for doing so:

“There were meetings to say that the Park is bringing schools and clinics and they brought goats as revenue sharing, so I stopped poaching and joined this group. I thought I would get benefits from the park as a reward, but I am still waiting.” – Mpungu RPA

The benefit of employment with the Park, and hope for employment in the future, were other deterrents mentioned (Table 4.5).
Table 4.5 - Employment as a deterrent against unauthorized resource use

<table>
<thead>
<tr>
<th>Employment deterrent</th>
<th>Stretcher Groups</th>
<th>RPAs</th>
<th>UWA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deters the whole community</td>
<td>n (17)</td>
<td>S</td>
<td>n (3)</td>
</tr>
<tr>
<td>Deters the employee’s family</td>
<td>3</td>
<td>0.090</td>
<td>1</td>
</tr>
<tr>
<td>Hope for future employment</td>
<td>4</td>
<td>0.058</td>
<td>0</td>
</tr>
<tr>
<td>Deters just the employee</td>
<td>1</td>
<td>0.026</td>
<td>1</td>
</tr>
</tbody>
</table>

RPA = Reformed Poacher’s Association, UWA = Uganda Wildlife Authority, n = number of groups / individuals, S = salience

Some do not go to the forest because they believe they are unable or because they are afraid of it. Some fear the animals of the forest (seven FGDs, S = 0.121), some believe that the forest is ‘impenetrable’ (one FGD, S = 0.047), and some do not have the energy to go either because they are old or unwell (two FGDs, S = 0.038). Old age or poor fitness were reasons given by two of the RPAs for giving up poaching and joining the association (S = 0.061).

Some members of local communities do not participate in unauthorized activity simply because it is a waste of time; they either have the resources they need (four FGDs, S = 0.119), have the money to buy what they do not have (five FGDs, S = 0.098), or believe that there are too few animals remaining for hunting to be worth their while (one FGD, S = 0.021):

“You could hunt all day and not get anything, so it is a waste of time compared to going to work for somebody who will pay you at the end of the day.” – Kiyebe RPA

Some ARUs fear entering the Park in case they are unlawfully arrested by rangers who do not speak Rukiga (two FGDs, both in Kagogo LC, Kashasha, S = 0.047). Two focus groups in Kashasha stated that the rangers were more frightening because they were foreign, which meant that they cared less about local people and could kill
them ($S = 0.035$). Other people feared to go to the forest in case the ARUs found
them there are reported them to the authorities (one FGD, $S = 0.032$).

Another minor deterrent is fear of damaging the communities relationship with the
Park (one FGD, $S = 0.039$). Two groups felt that they had benefitted so much from
the international relationships the Park had brought them, that unauthorized activity
in the Park would damage that relationship, which was enough to deter people ($S =
0.043$). Finally, one group ranked ‘research dissemination’ as a deterrent, because
knowing that their ideas and opinions were valued had given the community a sense
of ownership over the Park, helped them to understand why it was important, and
made them want to protect it ($S = 0.051$).

4.6 Into the future

The ways of reducing threats to the Park suggested by stretcher groups were very
similar to the ways of improving people’s lives. Some groups even said “if everything
we have just described [to improve lives] is done, you will not have to do anything to
protect the Park. Once people’s lives are improved, no one will need to extract
resources from the Park.”

All sources of information agreed that improving the distribution of benefits from
the Park would be far more successful in reducing unauthorized activity than
increasing the level of law enforcement. No FGDs and only 1.4% of CTPA
interviewees suggested improved law enforcement as a way of improving the
protection of the Park in the future. It was mentioned by three of the six UWA
representatives, but only in parallel with sensitization and development projects.

Stretcher groups most commonly stated that solving the major problems of lack of
employment (14 FGDs), crop raiding (13 FGDs), and mismanagement of revenue
sharing (11 FGDs), all of which contribute to local poverty and motivate
unauthorised resource use, would both improve peoples lives and reduce threats to
the Park.
4.6.1 Employment

Employment of local people was suggested by 14 stretcher groups, all three RPAs, and by 12.5% of CTPA respondents. People would like to be employed as law enforcement rangers (four FGDs, three RPAs), because they know the people and places involved in unauthorized activity. Other roles suggested include as porters (two RPAs), or vermin guards (five FGDs, one RPA), or clearing the Park boundary (one FGD). Mostly, though, people just want the employment process to be transparent and fair; without nepotism (seven FGDs), considering local knowledge as well as formal education (two FGDs), and giving consideration to the Batwa (two FGDs, both Batwa).

“We were evicted from the Park, but where we are, it is just near and adjacent to the Park. So everyday when I am just getting out of my house, I am facing the forest. I am looking at the forest. So if we were given employment then we would protect this forest, as we are near to it.” – Mutwa, Hamutumba stretcher group, Hakikome

4.6.2 Crop raiding

Although the issue of crop raiding was mentioned by only one of UWA’s staff, it was one of the most commonly discussed problems in both the FGDs and the CTPA interview, where it was included in 41.3% of responses to the question “What would you do if you were Park manager?” Participants said that for people to be lifted out of poverty, rely less on forest resources, and have a better attitude towards the Park, crop raiding must either be reduced or compensated for, or resilience must be built. In terms of compensation, people most frequently requested money (seven FGDs), although others would prefer to receive the equivalent mature crop that was lost (three FGDs), or seeds to replant (one FGD).
To reduce crop raiding, five FGDs and 2.8% of CTPA interviewees suggested fencing the Park (which one group stated would also help to keep people out), or employing guards to chase the vermin away (seven FGDs, 10.0% of CTPA interviewees). One FGD simply requested the equipment that they require to guard the crops properly themselves, such as hardwearing clothes and torches.

4.6.3 Revenue sharing

Improving the management, implementation and fairness of revenue sharing was suggested as a way of improving lives and reducing threats to the Park in 11 focus groups and in 16.7% of CTPA interviews. People believe that revenue sharing should go to those who bear the greatest cost of the Park (10 FGDs); those living or farming near to its boundary who suffer crop raiding, and those who struggle to survive without forest resources due to extreme poverty and lack of education. Participants suggested that there should be transparency in the amount of money available and the process of deciding who receives it, to eliminate corruption and ensure that the intended money reaches the right people (five FGDs, 7.1% of CTPA interviewees). Whilst most groups were happy with the percentage of the Park revenue that they were supposed to receive, two would like it to increase, as did two UWA representatives and 8.9% of CTPA interviewees.

All three RPAs suggested that a portion of the revenue sharing money or gorilla levy should be given specifically to the RPAs, as by no longer hunting they were helping to conserve the Park.

4.6.4 Integrated Conservation and Development project

Considering that bushmeat appears to be the most commonly extracted resource, primarily for household consumption due to a lack of protein in the diet, perhaps the most effective way of reducing unauthorized activities and improving peoples’ lives is to provide livestock, as suggested by 13 focus groups with stretcher groups, all three RPAs, and 52.0% of CTPA respondents. The animal most commonly suggested
by stretcher group was goats (13), but sheep, cows, pigs, chickens, rabbits and fish were also mentioned.

Another resource that could be supplied outside the forest to reduce pressure on the Park is firewood. Giving tree seedlings to community members was suggested by seven stretcher groups, one RPA and 14.6% of CTPA interviewees. Providing bamboo rhizomes was also suggested by four stretcher groups, with one stating that although the project had been implemented before, the younger generations did not have any and felt they were missing out. Rather than substituting forest resources, 11.4% of CTPA interviewees said that they would allow people to extract certain resources if they were Park manager, the most common of these being firewood (8.2%), but usually only on an occasional basis.

The ICD projects suggested by stretcher groups, RPAs and CTPA interviewees are shown in Table 4.6.

### Table 4.6 – Recommended future ICD projects

<table>
<thead>
<tr>
<th>ICD Project</th>
<th>Stretcher groups n=17</th>
<th>RPAs n=3</th>
<th>CTPA (%) n=281</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build schools</td>
<td>14</td>
<td>3</td>
<td>18.5</td>
</tr>
<tr>
<td>Give sponsorship to the disadvantaged</td>
<td>9</td>
<td>0</td>
<td>8.54</td>
</tr>
<tr>
<td>Improve the road network</td>
<td>9</td>
<td>1</td>
<td>12.8</td>
</tr>
<tr>
<td>Build health centres</td>
<td>7</td>
<td>0</td>
<td>16.4</td>
</tr>
<tr>
<td>Improve water supply</td>
<td>6</td>
<td>1</td>
<td>6.40</td>
</tr>
<tr>
<td>Expansion of Multiple Use Programme</td>
<td>4</td>
<td>0</td>
<td>12.1</td>
</tr>
<tr>
<td>Provide equipment</td>
<td>3</td>
<td>0</td>
<td>2.49</td>
</tr>
<tr>
<td>Village Savings and Loans Associations</td>
<td>0</td>
<td>0</td>
<td>4.60</td>
</tr>
</tbody>
</table>

RPA = Reformed Poachers Association, CTPA = Conservation Through Poverty Alleviation interviewees

### 4.6.5 Relationship between Park and people
Nine stretcher groups and 11.4% of CTPA interviewees said that they wanted a better relationship with UWA. They want UWA to come and talk to people, find out what their problems are and work together with them to find solutions. As a demonstration of the power of positive relationships, the relationship that people felt they had with CARE was the third highest ranking reason participants gave for giving up poaching ($S = 0.630$):

“They [CARE] used to come and talk to people at the village level and give us tree seedlings themselves. There was lots of interaction between CARE and the communities, which we liked and learnt a lot from. ... The peace we have and the livelihoods we have are because of CARE.” – Mpungu RPA

4.6.6 Sensitisation and conservation education

Six stretcher groups, 16.4% of CTPA interviewees and five UWA staff all suggested that further sensitization and conservation education was required to improve the protection of the Park in the future. The Rubuguri RPA even suggested that UWA employ them to go out and educate other poachers about the importance of conservation:

“As a Warden or CAM... I would give them [the reformed poachers] another role to play; sensitizing. Because they know different poachers in different localities, so [...] these people could carry the message and sensitise other poachers in other areas, such that they can leave the natural resources.” – Rubuguri RPA

One RPA, one stretcher group and one CTPA interviewee suggested cross visits with other National Parks in the country, so that local people could go and learn more about how other communities managed to co-exist with conservation, and share ideas and experiences.
5. Discussion

Unauthorised resource use around Bwindi is driven by a combination of poverty and attitudes, both of which are influenced by the Park and related ICD projects. Law enforcement is the primary deterrent against resource use, except in places where ICD has been successful in alleviating poverty and improving attitudes. In these cases, the benefits communities receive reduce unauthorized activity more than fear of the law. This chapter will discuss what influences poverty and attitudes towards the Park in communities around Bwindi, and how in turn they affect resource use, before making recommendations for future research and policy to improve the effectiveness of ICD.

5.1 Drivers of poverty

In order to understand how poverty influences resource use, it is important to understand the factors affecting poverty. Around Bwindi, these appear to be education, access to markets, and proximity to the Park.

Formal education influences most other factors related to wealth, namely number of children, sanitation, involvement in ICD design and implementation, and wellbeing.

People living within an hour of roads and trading centres are significantly wealthier, probably because they can more easily reach markets at which to sell their produce. Ten out of 17 stretcher groups suggested that improving the road network would help people to develop, by shortening travel time and cost to schools, hospitals, and markets:

“The Park should construct a road. The road network is very important. When somebody has grown Irish potatoes or he has planted trees and cut them for timber, this is one way of connecting and selling and accessing the market for what he has produced, and it is one way of raising school fees for the children.” – Mashoho stretcher group
People living within 0.5 km of the Park boundary are significantly poorer than those living further away. There are a number of potential explanations for this. Firstly, it could be that people living near to the Park are further from markets, but there appeared to be no significant relationship between these two variables.

Crop raiding is the second potential reason that people living closer to the Park are poorer. These people are likely to have their fields close to the Park boundary, and are therefore at greater risk of crop raiding. When crops are lost, a household loses not only their food, meaning that they have to buy replacements, but also their source of income with which to do so. Crop raiding may also influence wealth by limiting education. It has previously been reported (Aharikundira & Tweheyo 2011), and was confirmed by stretcher groups in this research, that children spend their days guarding their family’s crops rather than in school. Crop raiding also reduces the value of the land, so near the Park is often the only place that the poorest people can afford to live (Blomley et al. 2010). Unfortunately, frequency and severity of crop raiding data were not available for inclusion in analyses.

The third and final way in which proximity to the Park could influence wealth is through ICD projects. People living within 0.5 km of the Park felt that they were less involved in the design and implementation of projects, felt less ownership over them, and perceived themselves to receive fewer benefits than people living between 0.5 and 1 km away. The reasons for this are unclear. People living right on the Park boundary may receive the same benefits as those slightly further away, but perceive that they receive less because they have a negative attitude as a result of crop raiding. On the other hand, they may genuinely receive fewer benefits because they are excluded from ICD projects, for which there are three potential reasons.

Firstly, they could have difficulty attending project meetings. Living on the Park boundary might mean being further from the larger settlements where meetings are convened, making attendance costly in terms of both time and money:
“The problem is from the leaders. When they are convening meetings, they just have them in the centres. They should hold these meetings in the [crop raiding-] affected areas of the Park, then they would get the owners of the land.” – Woman, Hamubare A stretcher group, Ndego

Additionally, people living nearest the Park may feel unable to attend meetings even if they are near by, because then their crops will be left unguarded and may be raided:

“… all the time we are guarding crops. Even now we are seated here and people are not looking out for baboons! Who is there guarding the crops now? [To youth:] You, go and sit in the cassava plantation!” – Old woman, Hamushojo stretcher group, Hakikoome

The second reason that people living right at the boundary of the Park may receive fewer ICD benefits is because schools and clinics built as part of ICD projects are not built near enough to them. It is difficult for children living right on the Park boundary to attend schools that are not close by, especially when their role as vermin guards is taken into consideration:

“The Park has assisted by building schools … but they have only built one school in Ndego, some years ago. … They have built nothing in Kagogo, so it is the least important reason [that people do not extract resources from the Park.]” – Man, Habitebe stretcher group, Kagogo

Finally, people living 0.5 km or more from the Park boundary may receive more ICD benefits because they are wealthier, so have more power and influence to direct benefits towards themselves. A previous study found that the people who benefitted most from tourism around Buhoma were the wealthier, well-educated men, often with good social connections (Sandbrook & Adams 2012). On the other hand, people living 0.5 – 1 km from the Park boundary could be wealthier because they have received benefits from ICD projects, which have been successful in
alleviating poverty. It is not possible to determine which explanation is correct from this study, or if it is both, because wealth prior to ICD implementation was not measured.

5.2 Resources utilized

The most commonly extracted resource is bushmeat, which was not the case prior to gazettlement. However, whilst the relative importance of bushmeat has risen from its previously low ranking (Tukahirwa & Pomeroy 1993), the actual level of poaching may not have increased. Exploitation of other resources, previously ranked above bushmeat, is likely to have fallen. For example, it has previously been reported that medicinal plants are collected from the forest because health centres are too far away (Kamatenesi 1997), whereas most people now state that the primary motivation is because traditional medicine is more effective. The increased provision of healthcare through ICD could mean that it is now only the people who believe that traditional medicine is more effective who collect it. Similarly, CARE promoted the planting of eucalyptus and acacia (Blomley 2003), so perhaps most people can now obtain building poles, firewood and bean stakes outside of the Park.

5.3 Research aims

5.3.1 What are the socioeconomic profiles of people who extract resources?

Whilst the hypothesis stated that unauthorized resource users would be the poorest members of society, URUs were not significantly poorer or wealthier than any other group; it was only ARUs that were significantly wealthier than random households. This corroborates Blomley et al.’s (2010) finding that the MUP benefitted wealthier community members.

Despite URUs not being significantly poorer, they were found to live further from trading centres and closer to the Park boundary, both of which are characteristics of poorer people. In addition, evidence from FGDs suggested that most resources were
collected without authorization because people could not afford to own or buy their own. One reason that URUs did not appear significantly poorer than other households could be because the URU sample was not representative of the resource users active around the Park. The sample contained only a small group of suspected bushmeat hunters and 12 recent arrestees, half of whom were arrested for income-generating activities such as pitsawing and gold mining. The sample probably over-represents the proportion of people extracting resources commercially rather than for subsistence, which was the primary driver indicated by focus groups.

The aim of using the UCT was to be able to generate socioeconomic profiles of resource users without having to rely on known URUs, to avoid the problem of misrepresentation of unauthorized resource use. However, with the exception of firewood and access to markets, the UCT did not produce significant estimates of prevalence of resource use for people with different socioeconomic characteristics. It is not clear why UCT did not produce significant results. It could be that the sample size was not large enough. On the other hand, it could be because attitudes are a more important driver of resource use than poverty, and were not recorded in the CTPA interview to be able to use in analyses.

5.3.2 What motivates unauthorized resource use?

As stated in the second hypothesis, subsistence does appear to be the primary driver of unauthorized resource use, although focus groups indicated that negative attitudes as a result of crop raiding, mismanagement of revenue sharing and lack of employment are also important. Negative attitudes may result in unauthorized resource use regardless of socioeconomic status or positive attitudes generated by successful ICD projects (Blomley et al. 2010). However, it is likely that poverty and attitudes are linked.

Firstly, it has been shown that crop raiding has a greater impact on the attitudes of the poor (Blomley et al. 2010), probably because they are less able to cope with the
consequences. Secondly, poverty is exacerbated by the same factors that damage people’s attitudes; crop raiding, inequity of revenue sharing and lack of employment. Thirdly, wealthier households show more positive attitudes regardless of the benefits they receive (Blomley et al. 2010), whilst the attitudes of poorer households are strongly influenced by whether or not they receive benefits.

Since attitudes and measures of crop raiding, revenue sharing or employment were not recorded as part of the CTPA interview, their importance in driving resource use cannot be analysed using UCT. However, one stretcher group gave support to their importance:

“If all these four things [lack of employment, corruption in revenue sharing, crop raiding, and lack of education sponsorship] were addressed, then the other reasons [driving people to unauthorized resource use] wouldn’t matter.” – Kinyangaji B stretcher group, Murushasha

5.3.3 What deters unauthorized resource use?

The hypothesis that “individuals are less likely to be involved in unauthorized activities if they perceive that they receive an equitable share of the benefits and fair compensation for the costs of conservation” was proven to be correct. However, benefits and compensation are not the primary deterrents against resource use, as the majority of people do not perceive that they receive them in a fair or equitable manner. Instead, the greatest deterrent is most commonly law enforcement. However, in areas with relatively few costs and multiple benefits, law enforcement is not perceived as a deterrent at all.

For example, Mukono is an LC bordering the headquarters of the Park in Buhoma, where gorilla tourism was first established. The stretcher group here ranked law enforcement as the last of 13 deterrents, after eight different benefits their community received from the Park and ICD. Nkwenda is one of the neighbouring LCs, where the stretcher group stated that they believed their community to receive
no benefits from the Park, apart from one or two people being employed. Law enforcement and fear of death was the top ranking deterrent of unauthorized resource use. The primary difference between the two communities was that the Buhoma village walk (a tourism enterprise) passed through Mukono but not Nkwenda. The benefits of the Park and the tourists it brings were literally clearly visible to the community in Mukono. Visiting tourists donated money both to individuals and to village projects. People in Nkwenda, which is set just back from the main road, had difficulty selling handcrafts as tourists did not pass through, and felt neglected by the Park and ICD.

5.3.4 What is the best way to reduce unauthorized resource use in the future?

The data collected supports the hypothesis that “improvement of ICD will be more effective at reducing unauthorized resource use in the future than stricter law enforcement”. As one CCR put it:

“Law enforcement can reduce illegal activity, but it can never stop it completely. To reduce unauthorized activity in the future, giving benefits and employment is better than law enforcement.”

For unauthorized activity to be stopped, the underlying drivers must be tackled; poverty and negative attitudes, exacerbated by crop raiding, and not alleviated by revenue sharing or employment.

5.4 Recommendations for ICD and policy

Recommendations for ICD and policy are therefore as follows, in no particular order:

1) Reduce crop raiding through improvements in the Mauritius thorn living fence or employment of local vermin guards. The latter, in addition to reducing crop raiding, would provide employment for people without specific skills or formal education.
2) Target revenue sharing fairly and transparently. Consult communities to determine who should receive what share; if people want revenue sharing to indirectly provide compensation for crop raiding (as indicated in focus groups), then they decide the best way in which to do this.

3) Review the employment process and policy for both UWA and NGOs. There are a number of roles that local people could be employed in, not just as law enforcement rangers, but as porters, camp keepers, and vermin guards (see point 1). Whilst employing local people as law enforcement rangers risks increased unauthorized activity, this risk is reduced if they are employed alongside ‘foreigners’. The recruitment process should be transparent and clearly explained to local people to avoid negative attitudes towards the Park as a result of misconceived prejudices.

4) UWA should hold meetings with local communities on a regular basis to share information regarding the various problems both parties face and the solutions that could be and are put in place. Meetings should be held in locations that the poorest and often neglected communities can easily reach, and should be advertised to all well in advance.

5.5 Recommendations for future research

This research produced the following questions, which should be answered in order for ICD to be more effective in the future:

- Why are people living nearest the Park the poorest? How does the Park contribute to their poverty, or fail to alleviate it?
- As the people living nearest the Park are also more likely to be URUs, what can be done to improve their socioeconomic status and reduce unauthorized activity?
- Do ICDs really exclude those people living nearest the Park? If so, why? And how can this be changed?
• How does ICD influence wealth (or vice versa)? It should be made standard protocol that household wealth is measured before, during and after implementation of ICD, to test whether ICD projects improve the wealth of recipients, or just benefit wealthier people.

• How do attitudes and crop raiding influence unauthorized activity? This could be quantified with UCT if a larger sample size was used and if attitudes and frequency and severity of the impact of crop raiding on households were also quantified.

In attempting to answer these questions, a mixed methods approach should be used. This research has demonstrated the value of gathering information in different ways from various sources. It gives weight to conclusions, such as that bushmeat is the most commonly extracted resource, evidenced by both the UCT and FGDs. Using mixed methods also prevents Type I errors. For example, if only UCT had been used to investigate medicinal plant collection, it would have been concluded that very few, if any, people were involved, whereas FGDs suggested that the activity was relatively widespread.

5.6 Conclusions

The resources most commonly collected from Bwindi without authorization are bushmeat, firewood, medicinal plants and honey. Unauthorized resource use is driven by poverty (Figure 5.1), specifically the need for resources that cannot be obtained outside the forest due to lack of money or land. It is encouraged by negative attitudes towards the Park, which arise from the three ways in which the Park contributes to and fails to alleviate poverty; crop raiding, inequity of revenue sharing and lack of employment. Law enforcement exacerbates negative attitudes and poverty, but is the primary deterrent against resource use. ICD, when implemented fairly, has the potential to compensate for the costs of the Park and improve attitudes, therefore reducing unauthorized activity. At Bwindi, however, it currently fails to do so on the intended scale because the benefits do not reach the poorest people. For ICD to be more effective in the future, ICD projects should be
monitored to ensure that they benefit the people they target. In addition, communities should be consulted for their problems to be understood and for locally supported solutions to be developed.

Figure 5.1 – Revised conceptual framework of unauthorized resource and ICD at Bwindi
References


Namara, A., 2000. *People and Bwindi Forest: A Historical Account as Given by Local Community Members*, ITFC
Nuno, A. et al., 2013. A Novel Approach to Assessing the Prevalence and Drivers of Illegal Bushmeat Hunting in the Serengeti. *Conservation Biology*, 00(0), p.n/a–n/a.


Appendix I - CTPA interview

CTPA Resource User Questionnaire

Date: Interview Ref # ______________________________
Interviewer names: ________________________________
GPS Northing __________
Easting __________

Respondent type: (circle)
ARU UWA suspected BM hunter fresh arrest random community household

Describe household location: LC1: ____________________________
Parish: ____________________________

Density of neighbours nearby: (circle) none few/some many
Main type of surrounding land: (circle) farmland forest village/centre other:
Nearest village/trading centre (circle) under or over 1 hour walk
Nearest road for vehicle use (circle) under or over 1 hour walk

1. Interviewee

1.1 Name (optional) ____________________________ Interviewed previously Yes/No

1.2 Age: (circle) +60 41-60 21-40 Below 20

1.3 Ethnicity: (circle) BaKiga Batwa other ____________________________

1.4 What is your position in the community? ____________________________

1.5 How long have you lived in this village? (circle) <5 years 5-10 years >10 years

2. Homestead Information

2.1 What is your marital status? (tick)
Married ____________________________
Single [never married] ____________________________
Co-habiting ____________________________
Widower ____________________________
Divorced and separated ____________________________

If married, Number of wives __________
Number of households __________

2.2 How many people currently live in your household (including person being interviewed)?

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Number of males in this household</th>
<th>Number of females in this household</th>
</tr>
</thead>
<tbody>
<tr>
<td>+60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41-60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 20</td>
<td>Total number:</td>
<td>Total number:</td>
</tr>
<tr>
<td></td>
<td>Of these n. your own children:</td>
<td>Of these n. of your own children:</td>
</tr>
</tbody>
</table>

2.3 Do you have any children that have left home? YES/NO. If yes (number): ________

2.4 How many children would you like to have or wanted to have? ____________________________
3. Education

3.1 What is your level of education? (tick)
- No formal education
- Primary school
- Secondary school
- Other (please detail)

3.2 What is your children’s level of education? (tick)

<table>
<thead>
<tr>
<th>Education level</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not completed</td>
</tr>
<tr>
<td>No formal education</td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td></td>
</tr>
<tr>
<td>Secondary school</td>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

4. Health

4.1 Do you have [and look around for evidence]: (tick)
- Hand-washing water facilities at toilets
- Drying rack
- Kitchen with a smoke escape outlet

4.2 Where do you obtain water? (tick all that apply; if more than one circle main source)

<table>
<thead>
<tr>
<th>Protected source:</th>
<th>Unprotected source:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protected spring</td>
<td>Lakes</td>
</tr>
<tr>
<td>Bore hole</td>
<td>Ponds</td>
</tr>
<tr>
<td>piped water</td>
<td>Rivers</td>
</tr>
<tr>
<td>gravity flow scheme</td>
<td>Spring</td>
</tr>
<tr>
<td>roof catchments</td>
<td></td>
</tr>
</tbody>
</table>

4.3 How many of these diseases have you and others in your household had in the last 6 months:

Total number (not occurrence):

Tuberculosis, Measles, Polio, Tetanus, AIDS, Malaria, Scabies, Cough
CTPA Resource User Questionnaire

5. Livelihood

5.1 List the 3 most important income-generating activities to your household (most important first) - such as farming, livestock, tourism-related activities, forest resource utilisation, village market sales etc.

<table>
<thead>
<tr>
<th>Income-generating activity</th>
<th>Who in household does this?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2 On average how many meals do you and your family have a day? (circle) 1 2 3+ A DAY

5.3 How often do you / your family go hungry per week? (tick box below)

<table>
<thead>
<tr>
<th>Never</th>
<th>Once or twice a week</th>
<th>Three or four times a week</th>
<th>Above five times a week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Basic Necessity Survey

6.1 Show respondents the cards:

a. Which of these items do you think are basic necessities - things that everyone should be able to have and no one should have to go without? (tick boxes below)

6.2 Show respondents the cards again:

b. Which of these items does your household currently have? (tick boxes below)

<table>
<thead>
<tr>
<th>Item</th>
<th>Basic necessity items</th>
<th>Items household has</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stove (three stone)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clothes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firewood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built latrine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water source within one hour walk from household</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-meat food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road for vehicle use within one hour walk from household</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land for crops/household</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal healthcare [health care centre]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking utensils</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.3
CTPA Resource User Questionnaire

Discuss reasons for their choices with links to natural resources if appropriate (e.g. opportunities and deprivation of BNP towards such basic needs).

7. Wellbeing

7.1 If 1 is the worst and 5 the best, what number best represents your life at the moment? (circle) 1 = worst; 2 = somewhat bad; 3 = average; 4 = fine; 5 = best

7.2 Discuss reasons for score with links to natural resources if appropriate (for example, they need household building materials or fuelwood)

Engage the respondent in discussion about their goals, desires and ambitions for their future.

7.3 What are your main aspirations in life?
8. **ICD Projects**

8.1 Which ICD project(s) do you know about (no prompting; if not applicable write N/A)?

<table>
<thead>
<tr>
<th>ICD project</th>
<th>Know about</th>
<th>What impact did the project have on your household?</th>
<th>Were you involved in designing &amp; implementing the project?</th>
<th>What level of ownership of the project did you feel?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 = No benefits</td>
<td>1 = Bad</td>
<td>2 = No change</td>
<td>3 = Benefit</td>
</tr>
<tr>
<td>MUP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop raiding control projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health clinic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land provision</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goats</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trees / seedings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservation education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Livelihood projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Here note any discussion points:
CTPA Resource User Questionnaire

8.2 Are any family members an ARU? YES/NO. If yes:
Resource collected: __________________________________________
Zones: __________________________________________

9. Governance

9.1 Have you attended any National Park meetings? (circle) Y / N If yes:
What kind of meeting? _______________________________________
Who held the meeting (no prompts)? ___________________________
How was the meeting conducted? (circle)
I was...... excluded somewhat involved fully involved

Discuss with guiding questions:
Were there opportunities to ask questions and express their views? Did they feel listened to? Were the meetings too short / long? Cover everything they wanted? Was the purpose of the meeting clear and was this achieved?

a. How was the meeting outcome? (circle) Very Poor Poor Ok Good Very good

Ask the respondent to explain their answer:

9.2 If you were the national park manager, what would you do for local communities?
CTPA Resource User Questionnaire

10. Livelihood unmatched counting technique – introduce this as a game!

10.1 Show respondent both crop raiding cards face down (NOT with pictures); respondent chooses one card – show the pictures on this card and tick card type: Control ☐ Treatment ☐

How many of these animals (not which animals) have damaged your crops in the past year: _____

10.2 Show respondent both medical cards face down (NOT with pictures); respondent chooses one card – show the pictures on this card and tick card type: Control ☐ Treatment ☐

How many of these many ways have you or anybody in your household obtained medical treatment in the past six months:___________

10.3 Show respondent both honey cards face down (NOT with pictures); respondent chooses one card – show the pictures on this card and tick card type: Control ☐ Treatment ☐

How many of these places does your household obtain honey from:____________________

Do not use honey [circle]

10.4 Show respondent both energy cards face down (NOT with pictures); respondent chooses one card – show the pictures on this card and tick card type: Control ☐ Treatment ☐

How many of these places have you or anybody in your household got energy for cooking in the past year:__________

10.5 Show respondent both meat cards face down (NOT with pictures); respondent chooses one card – show the pictures on this card and tick card type: Control ☐ Treatment ☐

How many of these places have you or anybody in your household got meat from in the past year:____

10.6 Show respondent both building cards face down (NOT with pictures); respondent chooses one card – show the pictures on this card and tick card type: Control ☐ Treatment ☐

How many of these materials have you or anybody in your household used to build anything in the past year:______
CTPA Resource User Questionnaire

11. Interview close
11.1 Any comments or questions on anything that we have discussed?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

12. Motivations for resource use

12.1 Depending on the respondent and their responses, after closing the interview (or during) chat with the respondent to explore motivations for resource use through guiding questions considering the following:

Poverty   Income (To sell forest items or labour)   Cultural tradition   Societal norm / peer
Other

Discussion notes:________________________________________________________________________
Appendix II – Unmatched Count Technique cards

*Bushmeat - Control*

- **Amatungo gangye**
  Meat from my own animals

- **Enyama zomumaduuka amahango**
  Meat from the supermarket

- **Nke kihembo**
  Meat as a gift

- **Ibagiro**
  Meat from village butcher
Bushmeat – Treatment

Amatungo gangye
Meat from my own animals

Enyama zomumaduuka amahango
Meat from the supermarket

Okuhiiga
Bushmeat

Nke kihembo
Meat as a gift

Ibagiro
Meat from village butcher
Eizinga omumataka gabantu
Hives on community land

Omuntu we kyaaro
From a person in the village

Obwooki bwomumaduuka amahango
Honey from supermarket
Honey – Treatment

Ezinga omumataka gabantu
Hives on community land

Emizinga y’omwihamba
Hives from forest

Omuntu we kyaaro
From a person in the village

Obwoki bwomumaduuka amahango
Honey from supermarket
Building Poles - Control

- Ebinyaasi/Ebireere byokushakaza
  Grass/Banana fibres

- Amatafari agokize
  Bricks

- Amategura
  Tiles

- Sementi
  Cement
Building Poles – Treatment

Ebinyaasi byokushakaza
Grass

Amatafari agokize
Bricks

Amategura
Tiles

Empagi zokwombeka
kuruga omwichamba
Poles from the forest/park

Sementi
Cement
Medicinal Plants - Control

- **Emiti yemibazi omu musiri gwangye**
  Medicinal plants growing in my garden

- **Omushaakizi**
  From a herbalist

- **Irwariro ryo’mukaaro**
  Local health centre

- **Irwariro r’yomutauni**
  City hospital
Medicinal Plants – Treatment

- **Emiti yemibazi omu musiri gwangye**
  Medicinal plants growing in my garden

- **Omushaakizi**
  From a herbalist

- **Emiti yemibazi okuruga omwihamba**
  Medicinal plants from forest/park

- **Irwariro ryo’mukyaro**
  Local health centre

- **Irwariro r’yomutauni**
  City hospital
**Firewood - Control**

- **Amakara**
  - Charcoal

- **Enku kuriga omwishamba ryangye**
  - Wood from plantation

- **Okugura enku**
  - Wood bought from someone

- **Enku kuruga omukyaaro**
  - Wood collected around village
Fuel – Treatment

Amakara
Charcoal

Enku kuriga omwishamba ryangye
Wood from plantation

Enku kuruga omwihamba
Wood from forest

Okugura enku
Wood bought from someone

Enku kuruga omukyaaro
Wood collected around village
Crop raiding – Control

Enkobe
Baboon

Enjojo
Elephant

Empunu yomukishaka
Bushpig

Efumbiri
Duiker
Crop raiding - Treatment

- **Enkobe**
  - Baboon

- **Enjojo**
  - Elephant

- **Empunu yomukishaka**
  - Bushpig

- **Engagi**
  - Gorilla

- **Efumbiri**
  - Duiker
Appendix III – Structure of focus group discussions with stretcher groups

Parish:
LC1:
Name of Stretcher Group:
Date:
Contact Person (name and number):
Names of Participants:

Hello, my name is Mariel Harrison. This is Christopher Byaruhanga who is working with me. I am a student from Imperial College in London and I’m working with ITFC to research how to make projects around Bwindi more successful in terms of protecting the forest and helping the people who live around the Park. I hope that as a group you will be able to represent your community and give me some ideas about the different problems you and the Park face, and what solutions you think might work best in the future. Are you willing to spend an hour or so discussing these things with me?

Would you mind if I record this conversation, so that I make sure I don’t miss anything important that you have to tell me? Once I have written down all the important things you say, I will delete the recording.

To start, can each of you take a minute to tell me your name, age, where you’re from, how long you’ve lived around Bwindi, and what your specific role in the stretcher group is, if you have one?

How long has this group been established?

What projects or activities have you undertaken recently?

I am interested to know what makes some people want to go into the forest to extract resources, so I hope that you will be able to give me some ideas about why you think some members of your community do so. Some of the things that we discuss might be illegal, but I want you all to feel that you can talk openly about them, because you can’t get into any trouble for anything we discuss today.

The reason that I want to know about why people go into the forest is because sometimes it is because they have a problem in their lives, and sometimes it is because there is a problem with the Park. If we know what the problems are that make people have to undertake illegal activity, then maybe we can find solutions so that the Park is better protected, and people are happier.

As you give me the different reasons, I am going to write them all on bits of paper. Christopher will write the translation in Rukiga as well. Once we have all the different
reasons, we will put them out on the floor and rank them in order of importance. The thing that makes most people want to go to the Park, we will put at the top, and so on.

Now that we have list of the things that make people go into the Park, I would like to know what stops some people from going. Why do some people not go into the Park? Like last time, I will write down the different reasons you give me, then we will rank them.

What do you think should be done, by UWA, by the government, by Stretcher Groups and by the communities, to improve the lives of people living around the Park?

What do you think should de done by UWA, the government, Stretcher Groups and communities, to reduce threats to the forest, or to make the Park better protected?

Thank you all very much for your time and all the information you have shared with me. I hope that it will be used to make conservation projects around Bwindi better for both the forest and for local people. Before I go, do you have any further comments you would like to add, or questions you would like to ask me?
Appendix IV – Structure of focus group discussions with Reformed Poacher’s Associations

Parish:
Name of group:
Date:
Names of Participants:

Hello, my name is Mariel Harrison. This is Christopher Byaruhanga who is working with me. I am a student from Imperial College in London and I’m working with ITFC to research how to make projects around Bwindi more successful in terms of protecting the forest and helping the people who live around the Park. I hope that as a group you might be able to give me some ideas about the different problems and solutions and what you think might work best in the future. Are you willing to spend an hour or so discussing these things with me?

Would you mind if I record this conversation, so that I make sure I don’t miss anything important that you have to tell me? Once I have written down all the important things you say, I will delete the recording.

Firstly, I know that all you of are members of the Reformed Poachers Group, so I will be talking to you as people who used to hunt bushmeat. I’m hoping you will be able to share with me some of your experiences. Can each of you start by taking just a minute to tell me your name, where you’re from, and what led to you joining this group?

Can you tell me what are your different reasons for handing in your hunting equipment and joining this group? As you list them, I am going to write them down on bits of paper, then once we have them all I would like you to put them in order of what you think are the most important to the least important reasons, and tell me why.

When you used to hunt bushmeat, before you joined the Reformed Poachers Group, what used to make you want to hunt?
Like last time, I am going to write down all the different reasons on bits of paper, then we will discuss which drivers were greater than others and put them in order of importance.

From the reasons we’ve discussed already, why do you think some people still hunt?
Are there any other additional reasons?
Why don’t other hunters in your community join this group too?

Do you think you made the right decision joining this group, or do you sometimes wish you hadn’t and could still hunt?
Why?
If you were leaders in UWA or in government, what would you do with the Reformed Poachers Groups to make them work best for the reformed poachers and for the wildlife in the forest?

Thank you very much for your time and sharing your thoughts and ideas with me. I hope that in the future, the information you have given me will be used to make conservation projects better for the forest and for you. Before I go, do you have any questions or further comments you would like to add?
Appendix V – Statistical evidence of relationships between socioeconomic variables in the study population

ANOVA with post-hoc Tukey’s Honest Significant Difference

Model: Education = Age

<table>
<thead>
<tr>
<th>Age Class A</th>
<th>Age Class B</th>
<th>Difference</th>
<th>p-adj</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-40 years</td>
<td>20 and below</td>
<td>-1.08</td>
<td>0.891</td>
</tr>
<tr>
<td>41-60 years</td>
<td>20 and below</td>
<td>-1.44</td>
<td>0.779</td>
</tr>
<tr>
<td>Over 60 years</td>
<td>20 and below</td>
<td>-3.62</td>
<td>0.093</td>
</tr>
<tr>
<td>41-60 years</td>
<td>21-40 years</td>
<td>-0.35</td>
<td>0.814</td>
</tr>
<tr>
<td>Over 60 years</td>
<td>21-40 years</td>
<td>-2.53</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Over 60 years</td>
<td>41-60 years</td>
<td>-2.18</td>
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</tbody>
</table>

Pearson’s product-moment correlation

<table>
<thead>
<tr>
<th>Variable A</th>
<th>Variable B</th>
<th>Correlation</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
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<td>Education</td>
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<td>239</td>
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<td></td>
<td>Sanitation</td>
<td>0.347</td>
<td>272</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>ICD involvement</td>
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<td>260</td>
<td>0.013</td>
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<td></td>
<td>Desired number of children</td>
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<td>272</td>
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<td>Wealth</td>
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<td></td>
<td>ICD ownership</td>
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<td>236</td>
<td>0.009</td>
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<tr>
<td></td>
<td>ICD benefits</td>
<td>0.166</td>
<td>246</td>
<td>0.009</td>
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<tr>
<td>ICD involvement</td>
<td>ICD benefits</td>
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<td></td>
<td>ICD ownership</td>
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### t-test

<table>
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<th>Explanatory Variable</th>
<th>t</th>
<th>df</th>
<th>p-value</th>
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<tr>
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<td></td>
<td>Nearest Road (Under 1 hour)</td>
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<td>74</td>
<td>0.008</td>
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<tr>
<td></td>
<td>Nearest Centre (Under 1 hour)</td>
<td>2.18</td>
<td>67.6</td>
<td>0.033</td>
</tr>
</tbody>
</table>

### GLM

| Wellbeing         | Estimate | SE    | t      | Pr(>|t|) |
|-------------------|----------|-------|--------|---------|
| **Education**     | Intercept| 5.44  | 0.453  | 12.0    | <0.001  |
|                   | Somewhat bad| -1.96 | 0.50   | -3.93   | <0.001  |
|                   | Worst     | -3.63 | 0.69   | -5.23   | <0.001  |
| **Wealth**        | Intercept| 15.83 | 0.45   | 35.1    | <0.001  |
|                   | Somewhat bad| -2.56 | 0.50   | -5.14   | <0.001  |
|                   | Worst     | -5.29 | 0.70   | -7.53   | <0.001  |
| **ICD benefits**  | Intercept| 4.30  | 0.32   | 13.5    | <0.001  |
|                   | Somewhat bad| -0.31 | 0.36   | -0.89   | 0.376   |
|                   | Worst     | -1.43 | 0.50   | -2.88   | 0.004   |
| **ICD involvement** | Intercept| 17.52 | 1.14   | 15.4    | <0.001  |
|                   | Somewhat bad| -2.20 | 1.26   | -1.75   | 0.081   |
|                   | Worst     | -6.59 | 1.75   | -3.77   | <0.001  |
| **ICD ownership** | Intercept| 21.8  | 1.26   | 17.3    | <0.001  |
|                   | Somewhat bad| -1.42 | 1.40   | -1.01   | 0.314   |
|                   | Worst     | -5.33 | 1.96   | -2.72   | 0.007   |

Reference level = “Average”
| Distance Category | Estimate | SE  | t    | Pr(>|t|) |
|-------------------|----------|-----|------|----------|
| **Wealth**        | Intercept| 11.7| 0.47 | 25.0     | <0.001   |
| (0.5, 1]          | 1.96     | 0.63| 3.18 | 0.002    |
| (1, 1.5]          | 2.33     | 0.62| 3.85 | <0.001   |
| (1.5, 2]          | 2.27     | 0.71| 3.19 | 0.002    |
| (2, 6]            | 1.50     | 0.66| 2.27 | 0.024    |
| **ICD Benefits**  | Intercept| 4.08| 0.30 | 13.5     | <0.001   |
| (0.5, 1]          | 0.48     | 0.40| 1.21 | 0.229    |
| (1, 1.5]          | 0.03     | 0.41| 0.08 | 0.936    |
| (1.5, 2]          | -0.53    | 0.045| -1.18| 0.239    |
| (2, 6]            | -0.97    | 0.43| -2.25| 0.026    |
| **ICD Involvement**| Intercept| 15.4| 1.06| 14.4     | <0.001   |
| (0.5, 1]          | 2.17     | 1.42| 1.53 | 0.129    |
| (1, 1.5]          | 0.32     | 1.44| 0.22 | 0.825    |
| (1.5, 2]          | -0.89    | 1.61| -0.56| 0.579    |
| (2, 6]            | -2.93    | 1.53| -1.2 | 0.056    |
| **ICD Ownership** | Intercept| 20.6| 1.19| 17.3     | <0.001   |
| (0.5, 1]          | 2.31     | 1.57| 1.47 | 0.142    |
| (1, 1.5]          | 0.10     | 1.62| 0.06 | 0.953    |
| (1.5, 2]          | -1.82    | 1.79| -1.01| 0.31     |
| (2, 6]            | -2.98    | 1.69| -1.76| 0.080    |

Reference level: (0, 0.5]
### Appendix VI – Statistical evidence of socioeconomic profiles of resource users

**ANOVA with post-hoc Tukey's Honest Significant Difference**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group A</th>
<th>Group B</th>
<th>Difference</th>
<th>p-adj</th>
<th>Sig.</th>
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<tr>
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<td>ARU</td>
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<td>1.000</td>
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<td></td>
<td>Random</td>
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<td></td>
<td>URU</td>
<td>ARU</td>
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<tr>
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<td>ARU</td>
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<td>0.001</td>
<td>**</td>
</tr>
<tr>
<td>----------------</td>
<td>--------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-----</td>
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<td>ARU</td>
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</table>

ARU = Authorised Resource User, URU = Unauthorised Resource User

Sig. = Significance level; 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1