

EEEGL

ENTERPRISE ENVIRONMENT AND EQUITY IN THE VIRUNGA LANDSCAPE OF THE GREAT LAKES

BUFFER ZONE AND HUMAN WILDLIFE CONFLICT MANAGEMENT

IGCP LESSONS LEARNED

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Acronyms and Abbreviations

ANICO	Animateurs de conservation (Rwanda)
ASCA	Accumulated Savings and Credit Association
AWF	African Wildlife Foundation
BINP	Bwindi Impenetrable National Park
BMCA	Bwindi Mgahinga Conservation Area
BMCT	Bwindi Mgahinga Conservation Trust
BZ	Buffer Zone
CBO	Community Based Organisation
CCR	Community Conservation Ranger
CTPH	Conservation Through Public Health
DFGF	Dian Fossey Gorilla Fund
DRC	Democratic Republic of Congo
EAC	East African Community
EEEGL	Enterprise, Environment and Equity in the Virunga Landscape of the Great Lakes
FDLR	Forces Démocratiques pour la Libération du Rwanda
FFI	Fauna & Flora International
GMP	General Management Plan
GMRT	Gorilla Monitoring and Response Team
GPS	Geographic Positioning System
GVTES	Greater Virunga Transboundary Executive Secretariat
HUGO	Human Gorilla Conflict Programme
HWC	Human Wildlife Conflict
ICCN	Institut Congolais pour la Conservation de la Nature
ICDP	Integrated Conservation and Development Programme
IGA	Income Generating Activities
IGCP	International Gorilla Conservation Programme
ITFC	Institute of Tropical Forest Conservation
JMB	Joint Management Board
KRC	Karisoke Research Centre

LC	Local Council (Uganda)
LG	Local Government
MGNP	Mgahinga Gorilla National Park
MGVP	Mountain Gorilla Veterinary Project
NCDF	Nkuringo Conservation and Development Foundation
NEMA	National Environment Management Authority
NEPAD	New Partnership for African Development
NGO	Non Governmental Organisation
ORTPN	Office Rwandais du Tourisme et des Parcs Nationaux
PA	Protected Area
PAA	Protected Area Authority
PAC	Problem Animal Control
PNV	Parc National des Volcans
PNVi	Parc National des Virunga
PTA	Preferential Trade Area
RBM	Ranger Based Monitoring
RDB	Rwanda Development Board
REMA	Rwanda Environment Management Authority
SACOLA	Sabyinyo Community Lodge Association
TBNRM	Trans-Boundary Natural Resource Management
USAID	United States Agency for International Development
UTB	Uganda Tourism Board
UWA	Uganda Wildlife Authority
WCS	Wildlife Conservation Society
WWF	World Wide Fund for Nature
ZEP	Zone d'Echanges Préférentiels

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- Greater Virunga Transboundary Executive Secretariat
- CARE
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Executive Summary

This report documents and analyses the experience of IGCP in trying to prevent, respond to and mitigate the effects of human-wildlife conflicts around the four protected areas where the programme has been active since 1991.

The main approach has been to synthesise existing knowledge. This has been captured in three steps. Firstly, a review of secondary data including published scientific work as well as internal IGCP documents and data. Secondly, a series of consultation meetings with individuals and focus groups, and site visits were held for two weeks in June/July 2010 in DRC, Rwanda and Uganda. Thirdly, additional information was gathered after the field trip, mainly from former or current IGCP staff, in order to corroborate or complement the findings obtained during the two first steps. Where possible we have backed up this testimony with other sources of information, including scientific research published in journals, and IGCP and consultant evaluations of particular programmes and projects.

The difficulties that have been faced working on human-wildlife issues generate some of the 'lessons learned' in this report. However, these difficulties should not distract from IGCP's considerable achievements in the field. Indeed, it is IGCP's successes, set against the challenging conservation context of the region, that offer lessons that are likely to be of most interest, and practical value, to the wider conservation community.

Lesson 1: Human-Wildlife conflict has to be viewed in the broader context of cost-benefit analysis

A general feature observed throughout the region, but also in other parts of Africa, is that the poorest of the communities tend to live near the boundaries of protected areas, where land is usually cheaper and less accessible. Being on the front-line, these communities are also logically bearing most of the costs imposed by the protected areas and suffer the most from human-wildlife conflicts. It is therefore important not only to focus on preventing or mitigating the negative impact of human-wildlife conflicts, but also to carefully consider the nature and scope of benefits that are received by those front-line communities.

Lesson 2: Solutions aimed at preventing or mitigating human-wildlife conflicts have to be carefully and continuously assessed in the long run, through sustained monitoring systems

An observation made during this assessment reveals that very little has been done in terms of monitoring the outcome and impact of the various strategies aiming at preventing or mitigating the human-wildlife conflicts throughout the region. In some places such as at PNV in Rwanda, data exist for some extended periods of time, but have not been entered nor analysed. In general, the lack of quantitative datasets represents a significant loophole in the whole programme: without these, it is extremely difficult to make informed decisions and to properly assess what works and what doesn't, or what the general trends are over time.

Lesson 3: Solutions designed by humans are constantly challenged by adaptable wildlife. This requires constant vigilance and adaptable solutions by humans, but also basic and sustainable maintenance systems.

Once a human-wildlife conflict strategy has been designed and implemented, it needs to be properly followed up and constantly questioned. This lesson stems from two main observations: 1) never consider that only one solution will solve all problems, as wild animals will always show great adaptation skills in getting around the difficulties, and 2) if a solution requires regular follow-up and/or maintenance, reliable and long-term systems need to be worked out well before the actual solution is implemented, otherwise it is not worth the investment.

Lesson 4: Land-use practices around protected areas are usually overlooked but could bring about significant changes in decreasing conflicts.

While designing barriers such as stone walls or trenches can have some impact in reducing crop raiding by wildlife, the issue of land use in the immediate vicinity of the forest is probably even more crucial to consider. Most of the respondents recognised that land use practices could perhaps be adapted, but it appears that

there is still little understanding on how to address this issue in an appropriate way. Where possible, particularly in Rwanda and Uganda, local government structures have an important role to play, for instance by integrating land-use planning and human-wildlife conflict considerations into development plans at district or lower levels.

Lesson 5: "Participation" of local communities can be envisaged at different levels, but only certain types of participation have a real meaning and a chance of success.

In the development sector, there are different levels of "participation" that range from passive participation to self-mobilization. The experience of the buffer zone in Nkuringo seems to indicate that only the lower forms of participation have so far been secured, with the notable exception of the Nyabalemura village, which is self-mobilized. This observation can in turn explain the fact that communities around Nkuringo seem to have generally lost their motivation in the management of the buffer zone. Since 1998, IGCP and its partners have tried and tested a number of strategies addressing the issues of human-wildlife conflict and buffer zone management in the region. Some of these strategies have failed, others still need more follow-up or even look promising, but at the end of the day integrated and effective solutions have not been found yet. In this trial-and-error endeavour, most of the stakeholders have been consulted and involved in testing would-be solutions, which is in itself a very positive feature.

Lesson 6: Leadership among local communities has to be properly assessed and secured, and incentives revisited

Usual incentives, such as equipment or cash, don't necessarily offer guarantees of success but proper leadership motivated by the interest of the community gives better hopes. This lesson is particularly well illustrated by Nyabalemura village, which is technically not in the buffer zone but has spontaneously mobilized its own resources to tackle its own human-conflict issues, thanks to its enlightened leadership and motivated community.

Lesson 7: Once identified and agreed upon, buffer zone objectives have to be thoroughly implemented

The official management goals for the buffer zone in Nkuringo are "to reduce human-wildlife conflict while protecting the critically endangered mountain gorilla and to contribute to improved community livelihoods". Both goals have yet to be achieved, as HWC issues are still quite important, and community livelihoods have been only marginally improved. The several attempts made at identifying proper buffer crops that would act as a *de facto* barrier for wildlife while also offering economic prospects for the community, have so far not met the initial expectations.

Lesson 8: It is important to listen to communities before embarking on experimental buffer zone programmes

Since the creation of the buffer zone, the communities and some local authorities have been advocating for the use of tea plantations as a suitable option for achieving the double goal of the buffer zone. Because of financial constraints, other options have been tried instead, with very few positive results. In this situation, the community and its leaders have not necessarily been listened to, which has created a double challenge: on the one hand, the favoured solution, which seems to meet all commercial and technical conditions, has not been implemented, and on the other hand and as a result of failed alternatives, momentum and motivation have been lost, thus leading to disappointment and lack of engagement.

Lesson 9: Land purchase for conservation is a very complex issue that requires time for proper assessment

Nowhere in Uganda has the acquisition of land for conservation been more active than in Bwindi. The first plots of land were bought from private landowners, mainly farmers, in the Buhoma area in the 1990s. Later, much more land was acquired for the buffer zone in the Nkuringo area. In both cases, it has been taking several years to properly assess the process. While the land acquisition in Buhoma was mainly done on an *ad hoc* basis and lacked a clear land use strategy, the experience of Nkuringo seems to suggest that it was better planned and better implemented. However, the fact that the buffer zone hasn't yet fulfilled its double goal means that the initially high level of satisfaction of the community could slowly turn into a feeling of frustration and resentment.

The various lessons learned lead to some key recommendations which are highlighted in the last part of the report:

- Implement past recommendations

- Identify appropriate solutions for the sustainability of the HUGO programme
- Re-establish and maintain monitoring programmes at all levels
- Look for innovative strategies in addressing human-wildlife conflict issues
- Consider tea plantations as ultimately the only viable and effective solution for the Buffer Zone in Nkuringo

For more than 12 years, IGCP has been trying to work out the problems of HWC and design solutions, and many challenges have been confronted along the way. Even if some of the challenges are still valid or even more critical, IGCP's work has followed most of the positive features already highlighted in other lessons learned. On other hand, IGCP needs to focus more on a number of aspects in order to achieve long-lasting results in the area of human-wildlife conflict, such as the relationship between information and practice, the consistent support to solutions that work, or the quest for institutionalised and sustainable strategies.

I Introduction: IGCP's Lessons Learned initiative

The International Gorilla Conservation Programme (IGCP) was founded in 1991 as a partnership between the African Wildlife Foundation (AWF), Fauna & Flora International (FFI) and the World Wide Fund for Nature (WWF). IGCP was established as a regional programme working in the Virunga and Bwindi afro-montane forest habitats that straddle the borders of the Democratic Republic of Congo (DRC), Rwanda and Uganda. The goal of IGCP is to ensure the conservation of mountain gorillas and their forest habitat and this is pursued through three principle strategies:

- Establishing a strong information base, including support for ranger-based monitoring;
- Strengthening regional collaboration between DRC, Rwanda and Uganda, including support for Transboundary Natural Resource Management (TBNRM); and
- Supporting the livelihoods of people living around the parks.

IGCP approaches these strategies through partnerships, first and foremost with the three national protected area authorities, but also with international NGOs, local authorities, community based organisations and private businesses in the region.

Despite the evident difficulties of operating in this war-torn region, conservation efforts have led to tangible successes, most notably an increase in the number of mountain gorillas. The Lessons Learned initiative is intended to analyse and document the work of IGCP to understand how it has contributed to this success through a range of interventions that are aligned with the strategies outlined above. The Lessons Learned reports are intended to articulate the experiences, successes and weaknesses of a long-term conservation programme and to share this learning with the wider conservation community. The Lessons Learned initiative involves a series of analytical studies, each concentrating on a key theme of IGCP's work. The first three themes have now been completed. One of these looked at **Capacity Building**, which has been critical to IGCP's mission to work with and support the protected area authorities of DRC, Rwanda and Uganda. In DRC and Rwanda in particular, this has required significant work to build the skills, resources and procedures of the *Institut Congolais pour la Conservation de la Nature* (ICCN) and *Office Rwandais du Tourisme et des Parcs Nationaux* (ORTPN), which has now become the Rwanda Development Board (RDB), respectively (Kanyamibwa, 2008). The second completed study focused on **Community Conservation** which has risen up IGCP's agenda over the years, reflecting a growing awareness of the close association between conservation and local livelihoods. As with many areas of IGCP's work, community conservation has involved considerable innovation, most notably in the development and testing of a 'conservation enterprise' model that involves partnering private businesses to develop sustainable, conservation oriented businesses (Martin et al, 2008). The third report on Lessons Learned looked at **Transboundary Natural Resource Management**, which is one of the overriding strategies of IGCP. Whilst transboundary natural resource management (TBNRM) is now widespread, IGCP's experience has some unusual aspects that make an original contribution to conservation learning. Firstly, the cooperation between the three nations has been developed and sustained during an era of very poor international relations including various times when partner countries have been fighting each other. The second unusual aspect is that TBNRM in the Virunga region has developed from informal field level cooperation and only relatively recently moved up to ministerial level and formal agreements (Martin et al, 2009).

In addition to these three analytical studies, there is also a paper that summarises IGCP's **Achievements** since 1991 (IGCP, 2009).

Over the next couple of years, it is intended that resources will be available for further studies of other key areas of IGCP's work. One planned topic is **Tourism**. IGCP, and its predecessor the Mountain Gorilla Project, developed gorilla tourism and continue to play a central role in this industry, supporting the PAAs in developing sustainable practices and working to develop community-based campsites and lodges, as well as associated enterprises such as crafts. Another topic is **Ranger Based Monitoring**, an information system developed by IGCP in DRC and introduced into Rwanda and Uganda, enabling consistent information throughout the region and a strong basis for identifying threats and designing well targeted interventions.

The current study focuses on **Human-Wildlife Conflict Resolution** which IGCP has addressed on a number of fronts, including the construction of a buffalo wall around the Virunga massif, the formation of community-based associations for managing problem animals, and recent experimentation with resilient land-uses in the Nkuringo buffer zone in Uganda. Cutting across most of these topics is the experience that IGCP has gained with operating conservation interventions in a conflict zone, an experience which sadly remains relevant in DRC.

2 General Context

2.1 Geography and biodiversity value

IGCP operates in the four national parks that contain the mountain gorilla's remaining habitat. Three contiguous parks cover the Virunga forest block: Parc National des Virunga (PNVi) in the Democratic Republic of Congo (DRC); Parc National des Volcans (PNV) in Rwanda; and Mgahinga Gorilla National Park (MGNP) in Uganda. Thirty kilometres to the North in Uganda, lies the forest of the Bwindi Impenetrable National Park (BINP). For the purposes of this report we describe these collectively as the 'Virunga-Bwindi region'. This region forms part of the Albertine Rift, the western arm of the Great Rift Valley.

The current parks protect remaining fragments of montane rainforest which contain a rich diversity of flora, partly owing to the range of altitudes from 1100 to 4511 metres. A rich diversity of fauna also exists and this might have resulted from the area being a glacial refuge during the late Pleistocene (Infield and Adams, 1999). As a result of high species richness and endemism, along with high levels of threat, IUCN have rated the montane forests of the Albertine Rift as having the highest conservation priority in Africa (Lanjouw et al, 2001). Even within the greater Albertine Rift landscape, the Virunga and Bwindi stand out. Of 40 biodiversity rich areas surveyed in this landscape, the Virunga was found to be highest for both species richness and endemism, whilst Bwindi was ranked fourth (Plumptre et al., 2003). The region is perhaps best known for the mountain gorilla. The 2003 census in the Virunga mountains estimated a population of 380, whilst the 2006 census in Bwindi estimated 300; hence a global population of around 680, an improving but still fragile situation.

The montane forests of Virunga-Bwindi are also important for local and regional livelihoods. Part of this value derives from direct consumption of resources but the larger part is thought to derive from indirect 'ecosystem services' such as watershed protection, soil formation and protection, climate regulation and pollination. 'Ecosystem services' is an anthropocentric concept that refers to benefits to humans arising from the functioning of natural ecosystems (Myers, 1996). There is some evidence that these functions provide more services, or more reliable services, where biodiversity is high. In other words, biodiversity itself plays an important role in sustaining functions that are valuable to humans. Whilst our knowledge of this connection remains limited, it potentially completes the picture of a mutually reinforcing link between biodiversity conservation and livelihoods.

2.2 Historical and political context

The Virunga-Bwindi region has been characterised by cross-border movements either as a result of colonial powers that created artificial boundaries or people who were forced to move from one country to another for labour. The rich soil and rainfall have been favourable to agriculture and different activities including cultivators and pastoralists as well as hunter-gatherer groups (or Batwa).

The first country to gain independence was DRC (June 1960 from the Belgians) followed by Rwanda and Uganda in 1962 (respectively from the Belgians and the British). However, the region has been marked by civil wars and instability since the independence. The most tragic period was during the 1990s during the Rwandan genocide when over 1 million innocent people were killed, followed by various conflicts and mass killings in DRC between 1996 and 2003. Between 1998 and 2003, DRC suffered wars involving various armed groups operating mainly in the eastern DRC and the governmental army. There were also times of tensions between countries in the region, affecting movements across the borders.

In the second half of 2006, elections were held in DRC that promised a definitive end to the unrest. However, the unsuccessful operation of Disarmament, Demobilisation and Reintegration (DDR) which aimed at the reintegration of the rebels in the governmental army, led to clashes that broke out in the eastern part of the DRC between soldiers close to dissident General Laurent Nkunda and the governmental army. Battles, that are still lasting in the area also involve a number of armed groups such as Mai Mai and Forces Démocratiques pour la Libération du Rwanda (FDLR) and are leading to a massive displacement of the population. According to the Internal Displacement Monitoring Centre (IDMC), more than 500,000 persons are reported to have fled their homes in eastern DRC as of November 2007 and most of them are staying in camps close to the Virunga National Park (<http://www.internal-displacement.org>).

Despite this long period of war and conflicts, there are efforts for peace in the region. IGCP has been working under these unstable conditions for several years. Strategy to deal with emergency situations has been developed. Strong operational relationships have been engaged with conservation and humanitarian organisations and government authorities. In terms of capacity building, there is hope that new human and institutional capacity can be developed and countries can work together as reflected in the declaration for the greater Virunga transboundary declaration signed by the Ministers of the three countries in July 2008.

2.3 Stakeholders

The conservation and management of protected areas in the Virunga-Bwindi region depends on the involvement of a number of stakeholders. IGCP works with protected area authorities (PAAs), communities surrounding these protected areas, military and local authorities, the private sector and other conservation organisations. Among these, IGCP places special emphasis on the PAAs, communities surrounding protected areas and government authorities as described below.

2.3.1 Protected Area Authorities

In its work, the IGCP collaborates with various stakeholders including the protected area authorities in the three concerned countries. In Rwanda, activities of conservation in the Volcanoes National Park are conducted in partnership with the Rwanda Development Board (RDB) while in the Democratic Republic of Congo activities are run with the partnership of the "Institut Congolais pour la Conservation de la Nature" (ICCN). In Uganda, the Uganda Wildlife Authority (UWA) is the national institution in charge of national parks and wildlife reserves.

2.3.2 Communities surrounding protected areas

Over 90 percent of the populations surrounding the region's protected areas practice subsistence level agriculture, and many access the protected areas for water, fire wood, and food and for their livelihood production strategies (IGCP, 1996). The development of the relationship between park management and the communities is crucial. Except in Nkuringo, on the southern side of Bwindi Impenetrable National Park in Uganda, the national parks do not have buffer zones between the local communities and the parks' resource base. Conflicts between wildlife and local communities are therefore inevitable, either linked to access to natural resources in the park, problem animals damaging crops in fields near the edge of the park, and other conflicts with local populations.

2.3.3 Government authorities

While the three countries have a different historical protected area system, the three PAAs have a similar mandate in terms of overall protected area management. The main difference is in terms of institutional framework: in Rwanda, the Tourism & Conservation Department of RDB is under the jurisdiction of Rwanda's Ministry of Trade and Industry and the environment sector is in a different ministry (Ministry of Environment and Lands) where is located also the Rwanda Environment Management Authority (REMA). In DRC, ICCN is under the Ministry of Environment, Nature conservation and Tourism (Ministère de l'Environnement, Conservation de la Nature et Tourisme) while in Uganda, UWA and the Uganda Tourism Board (UTB) responsible for the regulation of tourism activities are both under the Ministry of Tourism, Trade and Industry, while the National Environment Management Authority (NEMA) is under the Ministry of Water,

Land and Environment (<http://www.nemaug.org/>). With the decentralisation process going on in different countries, the involvement of local governments has been one of the focal areas of IGCP.

2.4 Economic context

The three countries of the region are among the Medium to Least Developed Countries in the world (UNDP, 2006). Subsistence agriculture is the primary livelihood strategy of the population living around the Virunga-Bwindi region (IGCP, 1996). In much of the region, the population is classified as living in extreme poverty, with more than 50 percent without sufficient land to meet basic needs. The four national parks in the Virunga-Bwindi region were created at different periods but all are characterised by imposing a limit on the land available to the communities and creating a negative perception with respect to both the parks and authorities managing them (Lanjouw et al., 2001).

The industrial and business sectors are poorly developed in this area, offering few alternatives to the local populations, and the war, insecurity and political chaos in the region are among the major factors having inhibited business or industrial development. Fortunately, tourism (primarily gorilla tourism) is one of the largest sources of foreign revenue for countries in the region. Tourism is scored second provider of foreign currencies for Rwanda after tea. In Uganda, direct funds generated from the sale of gorilla-permits covered approximately half the self-generated management budget of the Uganda Wildlife Authority in 1999 (Kanyamibwa, 2008).

2.5 Policies and legislation

In terms of national policy framework, the three countries have different policies in terms of protected area legislation and management systems. The participation of local populations and district authorities in the management of protected areas is for example more advanced in Uganda and Rwanda compared to DRC where the formalization and institutionalization of participatory management is still under development. The use of specific natural resources from multiple-use zones within the protected areas in Uganda, a practice that is not catered for in the legislation in Rwanda and DR Congo is one example of such differences. These differences can have potentially negative repercussions on efforts to harmonise management approaches in the four protected areas. This is why one of the key activities of IGCP is to bring together both the legal and policy approaches in the three countries through the transboundary Programme.

In addition to several international conventions and treaties that are relevant to regional conservation of the afro-montane forest and in which the Governments of Rwanda, Uganda and DRC are party, the countries themselves have made efforts to participate in regional policy frameworks, such as:

- Preferential Trade Area (PTA) or Zone d'Echanges Préférentiels (ZEP), including Burundi, Kenya, Rwanda, Tanzania and DR Congo,
- The New Partnership for African Development (NEPAD) and,
- The East African Community (EAC). Both Rwanda and Burundi have officially joined recently, but not DRC.

2.6 Transboundary approach

Transboundary collaboration has been taken by IGCP as the best option to address common issues by the PA authorities, as the threats to the ecosystems come from all three sides of the border and therefore any management approach cannot be effective without cooperation within the 3 countries' protected areas management institutions. In addition, there are strong historical links within the Virunga-Bwindi region, which used to be part of one country. The similar ethnic and cultural background of the people, their shared languages and livelihood strategies also support regional approaches to the management of their shared natural resources.

One of IGCP's objectives is to bring together the three protected areas authorities, who have been operating as separate parastatal organizations with relative financial and administrative autonomy and management structures but who need mechanisms to harmonise conservation approaches between countries. IGCP works to support them to establish an overall regional framework for effective management by the development of non-conflicting approaches in management, and cooperation in transfrontier issues.

3 The process of the “theme”

3.1 Rationale

Human-wildlife conflict (HWC) is a major conservation and management issue where ever people and wildlife coexist. HWC can take many forms, including the destruction of crops and property, and competition for natural resources. Commonly the people worst affected by conflict are rural farmers. In many areas with community-based conservation schemes, conflict can undermine conservation efforts because the cost of living with wildlife is seen to far outweigh any benefits (Parker, 2003; Muruthi, 2005).

In the Virunga-Bwindi region, habitat destruction and human population growth mean that the mountain gorilla and other forest animals, such as bush pigs, elephant and buffalo, are increasingly coming into contact with people, often leading to conflicts. The impact on local people, many of whom are subsistence farmers, can include economic devastation through destruction of crops, living in a state of fear, inconvenience, and danger to life and limb (Macfie, 2000). For mountain gorillas, interactions with local people are a source of stress, can result in the transmission of human diseases, and can lead to direct physical attacks, disabilities such as loss of limbs from snares, and even death.

This report documents and analyses the experience of IGCP in trying to prevent, respond to and mitigate the effects of human-wildlife conflicts around the four protected areas where the programme has been active since 1991.

3.2 Methodology

The main approach has been to synthesise existing knowledge. This has been captured in three steps. Firstly, a review of secondary data including published scientific work as well as internal IGCP documents and data. Secondly, a series of consultation meetings (with individuals and focus groups) and site visits were held for two weeks in June/July 2010 in DRC, Rwanda and Uganda.

Thirdly, additional information was gathered after the field trip, mainly from former or current IGCP staff, in order to corroborate or complement the findings obtained during the two first steps. Throughout the process, we have relied heavily on the testimony of key stakeholders: IGCP staff, staff from RDB, UWA and ICCN, and leaders/representatives of communities where IGCP works, as well as third-party organisations (NGOs, projects, etc.). Where possible we have backed up this testimony with other sources of information, including scientific research published in journals, and IGCP and consultant evaluations of particular programmes and projects.

Having described the situation of human-wildlife conflict in the 4 gorilla parks, the study proceeds to the history of IGCP's involvement in the theme, and then to an analysis of achievements, weaknesses and lessons learned.

3.3 Human-wildlife issues in the four gorilla parks

Despite containing relatively similar afro-montane habitats, the two forests harbouring mountain gorillas show different sets of issues relating to interactions between humans and wildlife. Even within the common forest block shared by the three countries, the situation can greatly vary between countries, based on ecological

features but also on social aspects and land use. This section gives a brief summary of the specifics of each park, along with general trends observed over the recent past.

3.3.1 Volcanoes National Park (PNV), Rwanda

Problem animals and crop-raiding in PNV have been part of the picture for a very long time. Historically, buffaloes, bushbucks and duikers have been the most regular problem animals, with elephants doing occasional damage (Plumptre et al, 2004). Gorillas were almost never recorded as doing significant damages, with the exception of some habituated groups (Sabyinyo and 13) sporadically visiting the park boundary and debarking a few eucalyptus trees.

Over the last few years, the situation has somehow changed, with many more incidents involving gorillas debarking eucalyptus trees and going further outside the park, and a noticeable increase in elephants exiting the park, while buffaloes are still the main cause of crop-raiding (Ngaboyamahina, 2004; Ndimukaga, 2006; Ndagijimana, 2009). This increase in crop-raiding incidents seem to be somewhat in contradiction with a recent wildlife survey showing an actual decrease in large mammal populations, at least at the local level in the Karisoke area (Arakwiye et al, 2010).

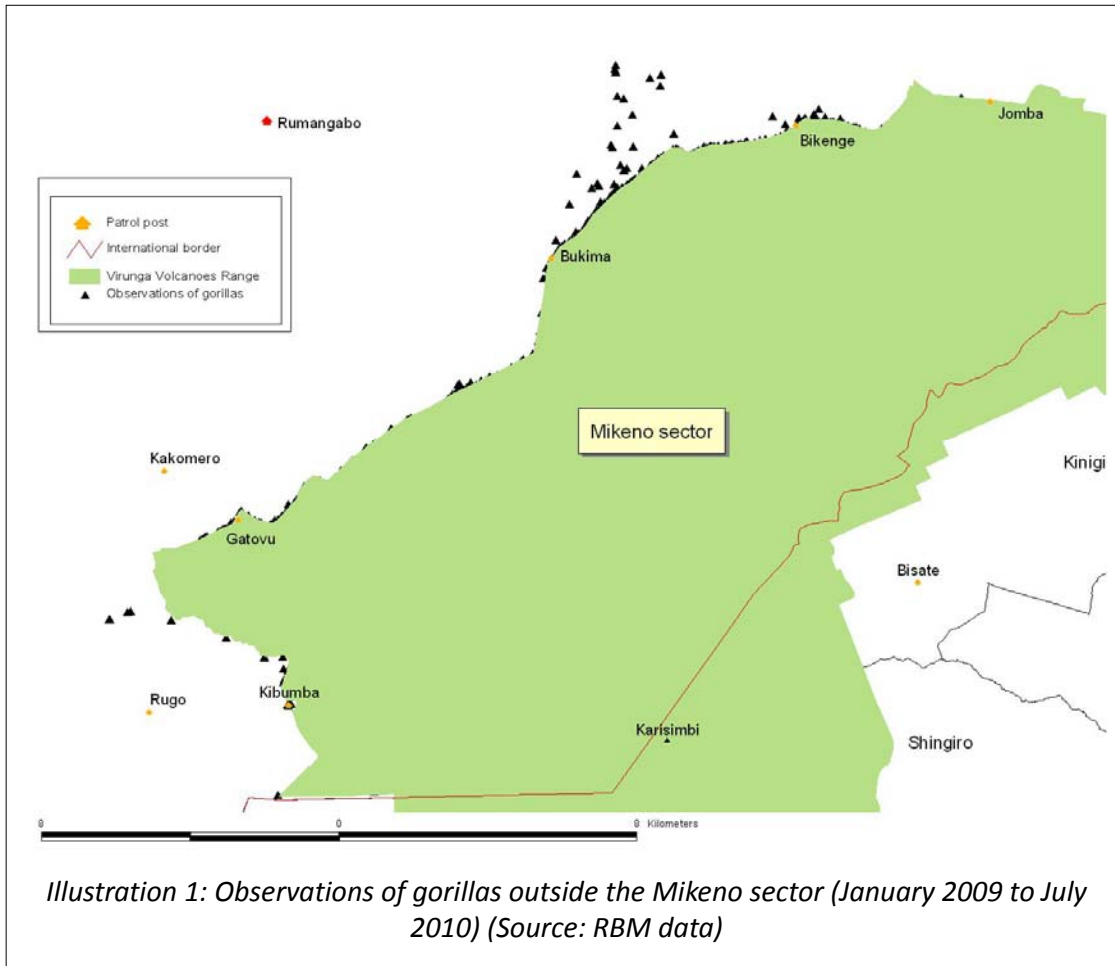
In a recent survey, Kwizera & Ndayisaba (2009) have identified the critical areas where wild animals cause the most problems in the 4 sectors of Gahunga, Nyange, Kinigi and Shingiro.

3.3.2 Virunga National Park, DR Congo

The trend observed in the Mikeno sector of Virunga National Park is also an increase of human-wildlife incidents over the years. The lower population density and regular episodes of insecurity, has led to a reduced land occupation outside the park but also to disturbance on wildlife species inside the forest, can mainly explain why problem animals tend to exit the park in bigger numbers and travel on larger distances. Consequently, animals like buffaloes and elephants, but also gorillas, can potentially impact communities up to several kilometres from the park boundary.

Buffaloes and elephants exit the park anywhere along the Mikeno sector boundary, but buffaloes are more often reported in the Jomba and Bukima areas, while elephants are more active around Jomba, Bukima and Bikenge (Bichamakara, pers. comm.). For the first 6 months of year 2010 only, more than 15 buffaloes were killed while outside the forest (Mburanumwe, pers. comm.). People are regularly injured by buffaloes or elephants, and fatal accidents have also been reported.

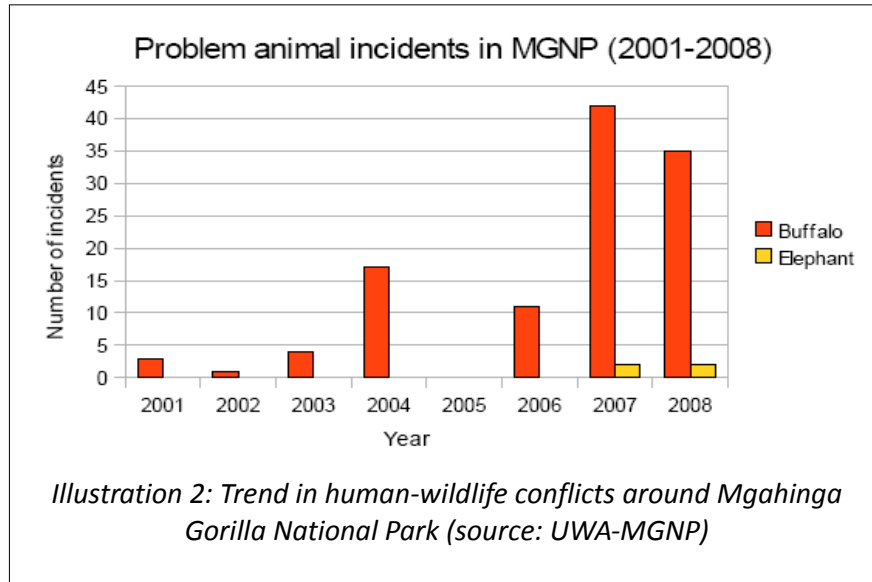
Regarding the gorillas, the Rugendo group was historically the only group that was reported outside the forest, sometimes up to several kilometres, and feeding on crops such as maize (Madden, 1999). These days, Rugendo has continued its habit to spend large amounts of time outside the park, sometimes without returning to the forest for several days in a row. Other gorilla groups such as Humba and Mapuwa or lone silverbacks, are also now increasingly frequenting maize and banana fields on community land (ICCN, 2009).



3.3.3 Mgahinga Gorilla National Park, Uganda

In villages neighbouring the eastern side of MGNP (Gitenderi parish) the major problem animals are porcupines and birds, with porcupines being regarded as the worst crop raider because they damage Irish potatoes the economically important crop. Communities estimate the crop loss at around 40%. Generally crop raiding by porcupines has always been reported. Before the gazettement of the national park (1991), farmers used to trap them and kill them, which reduced the problem. After gazettement of the national park, this procedure stopped and since 1992 the problem has increased (Musaasizi et al, 2005).

By contrast, the communities living around the western side of MGNP (Gisozi parish) experience the most problems with buffaloes and elephants. Buffaloes in particular come out in large numbers and can be observed as far as 2 to 3 kilometres outside the park. The elephants and buffaloes prefer to eat maize but the elephants uproot other crops as well. Elephants only come twice a year when the maize is about to be harvested and they normally come in groups of four. They will only start eating the potatoes if there is not enough maize. In this parish the local community consider themselves helpless to defend their crops from these raiders (Musaasizi et al, 2005). The graph below shows the recent trend in HWC relating to buffaloes and elephants incidents.



There is only one habituated gorilla group, Nyakagezi, that frequents MGNP on a part-time basis, and this group has never been reported outside the park. There has been so far only one case of gorillas exiting MGNP, a silverback that stayed near a village for a few days around 2007.

3.3.4 Bwindi Impenetrable National Park, Uganda

Overall in BINP, Olupot et al (2009) have established that the following animals come out of the forest, by order of occurrence: baboons, bushpigs, gorillas, arboreal monkeys and duikers. Elephants come out rarely, but their impact is potentially very high on the crops or the security of the communities. Crop raiding by wildlife around BINP is an issue that contributes to hostility between the park and local communities (Blomley, 2003). The frustration of local communities is heightened by somewhat unclear provisions within the Wildlife Statute and Local Government Act, leading to uncertainty over who should deal with the problem (UWA or the districts) (Republic of Uganda, 1996; UWA, 2002; Blomley et al, 2010). Even if there seems to be a clear distinction between "vermin species" such as baboons or bushpigs, and "problem animals" like gorillas, elephants or other protected species such as arboreal monkeys, the responsibility of dealing with human-wildlife incidents is still confusing (Namara, 2006).

Even if gorillas come only third on the overall list of problem animals, their high profile both as a critically endangered flagship taxon and as a major economic resource gives them a particular weight in the perception by local communities (Namara, 2006). It seems that historically, gorillas used to spend time outside what is now BINP, when those areas were still forested (Madden, 1999; Macfie, 2000). Habitat loss can partly explain why ranging patterns of some gorilla groups straddle the current park boundary. Most of the authors however suggest that gorilla habituation for tourism but also increased protection have been the main factors explaining the increasingly high numbers of exits of gorilla groups to community land, with a number of negative consequences on farm crops, personal security and disease risks (Goldsmith, 2005; Madden, 2006; Andama, 2009). The following map shows the trend in gorilla groups spending time outside the forest, thus contributing to potential or actual human-wildlife conflict occurrences. A total of 9 habituated groups are known to have come out of the forest, or on the boundary, over the last 10 years. The "worst offenders" are Nkuringo, Habinyanja, Rushegura and Mubare. An interesting observation, which seems to validate the notion that habituation has a significant influence on the habit to leave the forest and engage in crop-raiding, is that groups more recently habituated, such as Shongi, Bitukura, Oruzogo and Kahungye, have not been observed outside of the forest, at least not far from the boundary. It will be important to observe the trend over the next years. An important exception to the general trend described above is the Bwindi research gorilla group, Kyarugilo, which has only been observed on the forest boundary on a couple of occasions.

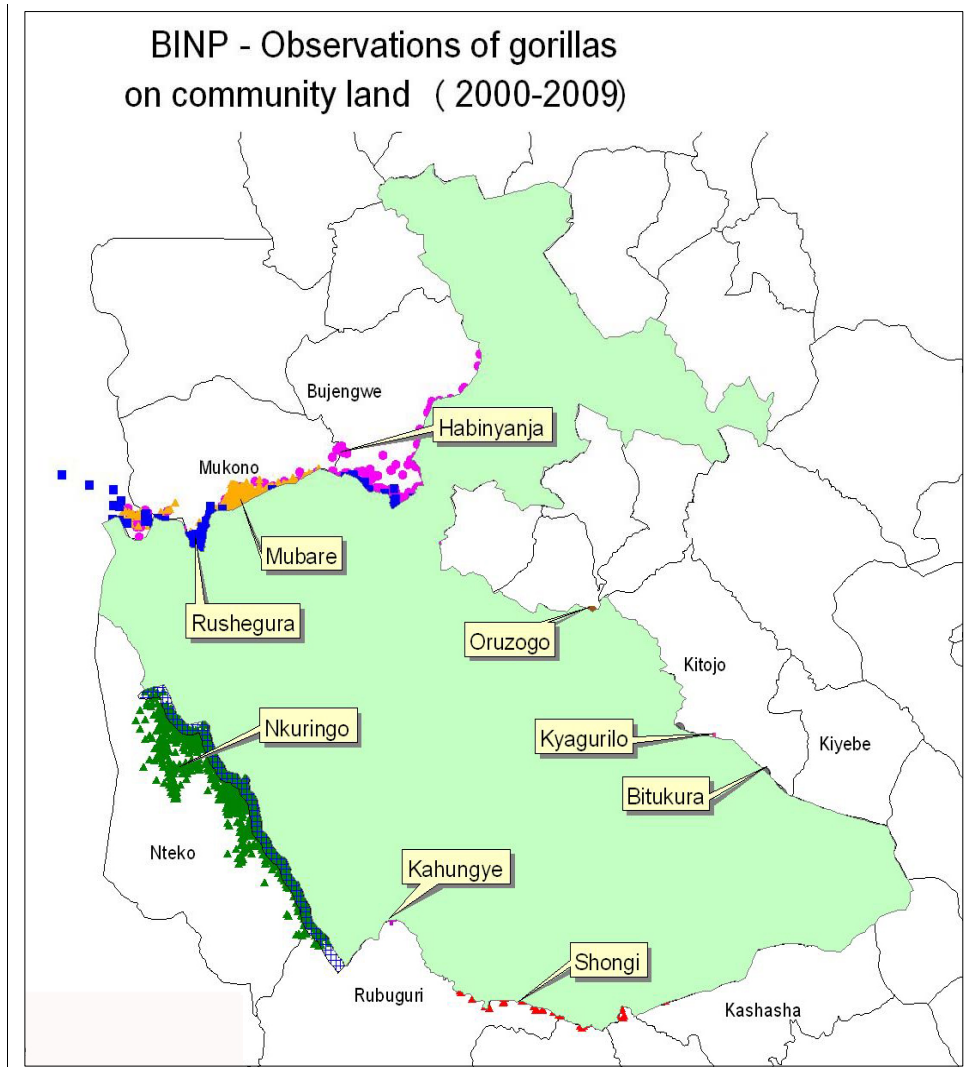


Illustration 3: Observations of gorillas on community land (2000-2009). Only the locations outside the forest and in the buffer zone are shown on this map (Source: RBM data).

Box 1: HUGO groups around the south-east of Bwindi Impenetrable National Park, Uganda

The three HUGO groups located in the parishes of Kiyebe, Kitojo and Kashasa were set up in 2007. They deal mainly with elephants, but are also involved in chasing other species, like gorillas and baboons. There are 4 members of HUGO in Kiyebe, 6 in Kitojo and 10 in Kashasha.

As a routine, HUGO members patrol the boundary twice a week, looking for illegal activities and for animal exits. If they see something interesting, they report it by mobile phone to the UWA Community Conservation Ranger (CCR). Each HUGO group has a mobile phone and some airtime, provided by IGCP.

In case of crop-raiding by elephants, they will start intervening themselves, by mixing dried red chillies with sawdust, in a tin can, and the mixture will burn for approximately 3 hours. In some cases, the farmer calls the CCR, who then organise an UWA patrol that will do scare-shooting if the red chillies have not worked.

The incidents, which predominantly happen during the wet season, are increasing in all parishes, and the elephants are going further and further into the community. They used to stay in a band of less than 50 metres outside the forest, but they now venture as far as 1 km outside. Elephants are also seen more and more during the day, and they are obviously getting used to the community. The change has been noticed since last year (HUGO groups, pers. comm). The crops which are raided by elephants are mainly sorghum, Irish and sweet potatoes, yams, beans, peas and banana trees. The crop-raiding information is collected by the HUGO teams, who only record estimates and not accurate data.

The HUGO members also record information on other species, like baboons, bushpigs and monkeys. Most damage these days are done by elephants, and then baboons and bushpigs. They also now follow gorillas which are occasionally leaving the park in the area: Bitukura group (12 individuals) in the Ruhija area and which feed on eucalyptus bark; Shonji group (34 individuals) in the Rushaga area and which feed on bananas. These newly habituated gorillas don't spend much time outside yet, never more than 1 hour at this stage, and they tend not to venture far outside. Once the information of crop-raiding gorillas received, the GMRTs organise the chasing and use mainly bells and whistles to push the gorillas back into the forest.



The HUGO members work as volunteers and receive some support from IGCP in the form of equipment such as tarpaulins and boots, and from UWA in the form of red chillies and sawdust. Contrary to other HUGO groups, they currently don't receive food rations from UWA, but this should be included in the next budget. They have formed ASCAs, which are an informal saving system where each member puts aside a certain predetermined amount of money every week as savings.

Even if some of the communities recognise the value of the work done by the HUGO groups, they don't remunerate them nor give them any gratification in nature. The communities should also be more sensitised and made to understand that HUGO members are not employed by UWA nor by IGCP.



3.4 History of human-wildlife conflict resolution by IGCP

3.4.1 Human-Wildlife Conflict Management

3.4.1.1 The HUGO programme in BINP

The Human Gorilla (HUGO) Conflict Resolution programme was established in 1998 to prevent or mitigate the effects of conflicts between mountain gorillas and the human population living close to Bwindi Impenetrable National Park (BINP). It was one of a number of responses by the Uganda Wildlife Authority (UWA) to escalating conflict between local people and Park staff that had arisen from attacks on crops and people by gorillas. HUGO was conceived as a basis for addressing gorilla crop raiding in the short-term and improving relations with local people in the long-term (Macfie, 2000; Byamukama & Asuma, 2006).

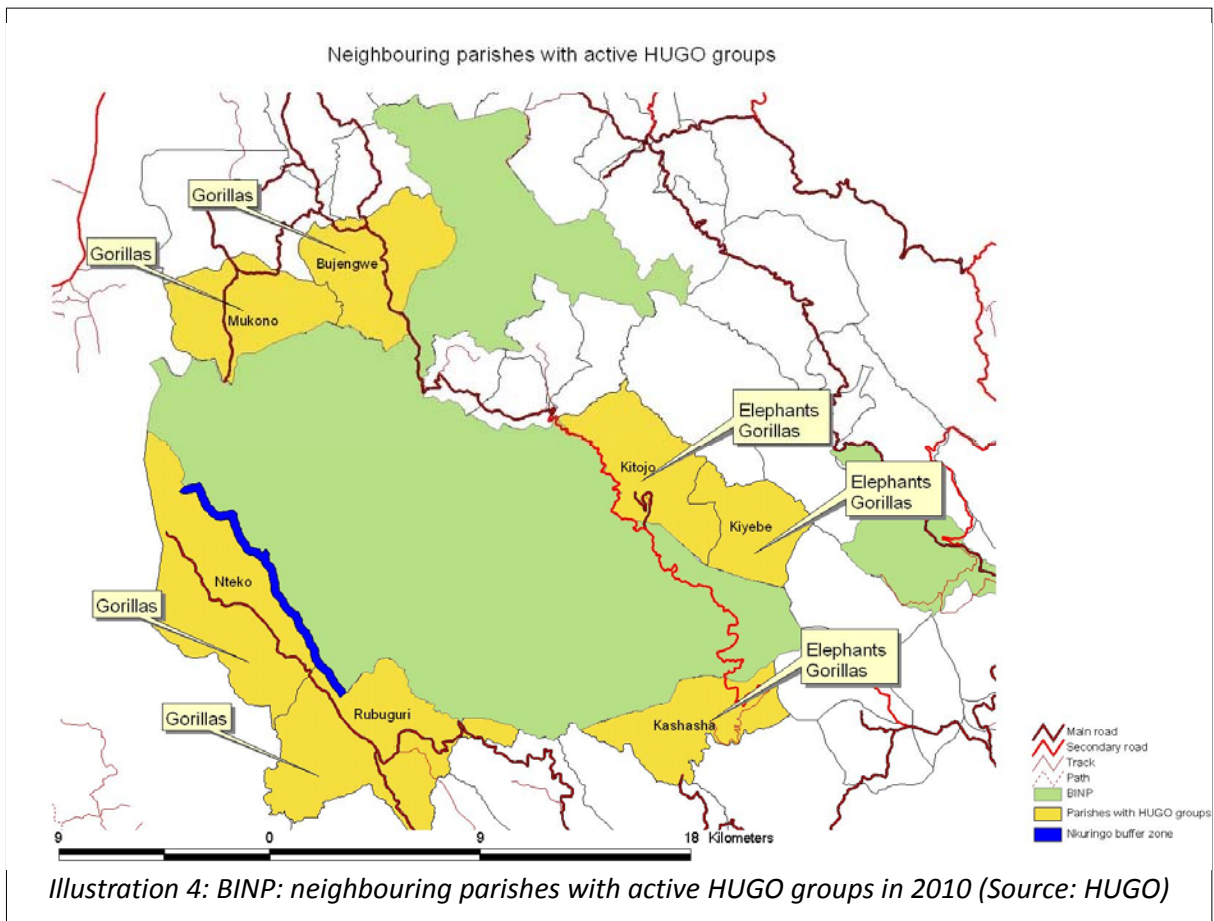
The main activity to immediately address gorilla crop-raiding was a co-ordinated effort at chasing gorillas back inside the forest whenever they leave the park. The HUGO pilot programme tested negative reinforcement in primate behaviour by chasing the gorillas to see if sustained chasing was sufficient to alter gorilla crop-raiding behaviour. The pilot programme started with two Gorilla Monitoring Response Teams (GMRTs), one from Mukono Parish, one in Nteko Parish. GMRTs are made up of trained local volunteers chosen by their communities, supervised by a UWA ranger. The team leaders, also called HUGO supervisors, are UWA rangers, who monitor gorilla movements with GPS data, and report to the park Warden in Buhoma. Whenever gorillas are detected out of the park, GMRT members were mobilised to chase gorillas back to the park. The HUGO programme also included components geared to preventing conflict through land purchases, and promotion of land use practices that were not attractive to gorillas (Musaasizi, 2006).

The chasing activities were designed as a short term remedy to the conflict but the broader HUGO programme also included the initial activities of the UWA veterinary unit to address disease risks which later included community health/hygiene sensitisation programs in human-gorilla conflict parishes. An analysis in 1999 established that there were favourable results from continuous chasing. The other benefits identified during the analysis were that communities now understood that UWA was willing to respond to their concerns and that joint park-community solutions were effective (Madden, 1999).

Subsequent to the analysis, in a joint IGCP/UWA programme, a third GMRT was started in Bujengwe Parish in 2000 and attempts at modifying land use patterns in areas frequented by gorillas especially in Nkuringo were made through land purchase between 2002 and 2004. In addition, attempts were made to strengthen the institutional arrangements surrounding human-gorilla conflict situations which provided a stable forum for regular dialogue and negotiation between community representatives and park staff (Musaasizi, 2006). In 2010, there were a total of 7 HUGO groups on the Buhoma side, covering the parishes of Mukono and Bujengwe.

In 2007, three HUGO groups were created in the parishes of Kiyebe (6 persons), Kitojo (6 persons) and Kashasa (10 persons), on the south-east flank of BINP. These groups deal mainly with elephants, but they are also active in chasing other species, particularly gorillas and baboons.

On the Nkuringo side, the first HUGO group was created in 1998, and a second group setup in 2007. Nteko parish currently has 29 members, and Rubuguli 15 persons. In this area, HUGO groups deal mainly with gorillas, but they also tackle other issues, especially baboons.



3.4.1.2 HUGO in DR Congo

Building on the Uganda example, the HUGO programme was extended to the Mikeno sector as of 2001, and three groups of 10 people each were put in place in Jomba, Bikenge and Bukima. When they were installed, the groups received training and equipment, and benefited from an income-generating programme. There is little information existing on the effectiveness and the impact of the HUGO teams in DRC, as all the data collected in the first years of the programme disappeared when the Rumangabo station was ransacked and looted by rebel groups in 2008.

Since then, ICCN has shown an interest in HUGO, but has recently decided to use the existing 40 members as patrol assistants (Mburanumwe, 2010a). As HUGO members know their respective areas quite well and they also have good intelligence, they are now mobilised by the rangers to accompany them to the peripheral parts of the forest and are particularly active in removing snares.

Box 2: Wall maintenance and crop guarding by Abatiganda, Volcanoes National Park, Rwanda

Abatiganda was established as a cooperative in 2008 and has currently 171 members, who work exclusively as volunteers. Their activities deal with crop protection, and the building and maintenance of the buffalo wall and trench. They cover a total distance of ca. 2.5 km of the park boundary, along three cells in the Guhanga sector (Musanze District).

On Mondays and Thursdays, cooperative members do repair work on the wall and the trench. Other groups regularly patrol the boundary during the day and report any potential problem animals, which are the buffaloes and occasionally the elephants (there are no gorillas in that area). During the harvesting seasons, they organise surveillance of Irish potato crops, by building basic huts where they post people during the nights, from 5pm until 7am, for a duration of 3 months. The crop surveillance is carried out on a depth of about 400 m from the boundary. There are regular contacts with the PNV rangers who are posted in the region, and they provide them with regular information.

Although the buffaloes can still leave the park and raid the crops, the wall and the trench have had a significant impact since they were built. The wall break-outs happen mainly during the wet season, when the buffaloes apparently are looking for drier land, and during the harvesting time. After potatoes, the crops most raided are wheat and maize. Pyrethrum crops are also eaten by buffaloes (the leaves are palatable).

There is no remuneration system, although some of the members are land owners or have crops in the area that is covered. Their only interest is for the community, although they know that they can benefit from the revenue-sharing programme and also have privileged access to tenders when RDB needs to commission certain works. For instance, this cooperative has had a RWF 2 million contract with RDB for the original construction of a segment of the wall. The members are also sometimes able to rent a plot of land from a landowner and cultivate their own crops.

Since the launch of the cooperative, 8 members have been wounded in buffalo-related incidents, and one person is paralysed. The park has not provided any assistance for those injured during the incidents.



3.4.1.3 The Buffalo wall around the Virunga range

The very first buffalo wall that was erected around the forest was at Mgahinga Gorilla NP, immediately after the official gazettelement of MGNP into a national park in 1991. The first objective of this 7-km section of the wall, financially supported by Berggorilla und Regenwald Direkthilfe (BRD), was to serve as physical demarcation, together with concrete pyramid markers, after the previously cultivated zone "Zone 2" of the park had been reclaimed and left to regenerate after more than 40 years of cultivation had taken place. The second objective was to prevent large mammals, particularly buffaloes and elephants, to exit the park and cause damage on community land (UWA, 2001). In 1995, CARE Uganda supported the extension of the wall as assistance to the Uganda Wildlife Authority. Then in 2004/05, IGCP supported building the wall along the Uganda DRC border, which was then upgraded in 2009 (Ezuma, 2009). The total boundary length in Uganda is ca. 16 km.

Construction of the buffalo wall around PNV in Rwanda started in October 2002 and the whole perimeter of the park, 76 km, was completed by 2007 (Kwizera & Ndayisaba, 2009). The construction of the wall was initially facilitated by IGCP and CARE, and in the first few years there was no or very little maintenance performed on the wall (Bana, 2007). A first improvement of the wall was initiated in 2009 with the digging of a trench on the inside of the wall, along priority sections of the boundary. After 2007, four associations were put in place, each one being in charge of the wall and trench maintenance in the four most delicate sectors (Gahunga, Nyange, Kinigi and Shingiro) (Nielsen and Spenceley, 2010). Each association has around 150 members, and is actively involved in several activities: patrolling the boundary, fixing the wall where it has been broken, guarding the crops during the harvest season, and liaising with RDB staff when there are important issues.

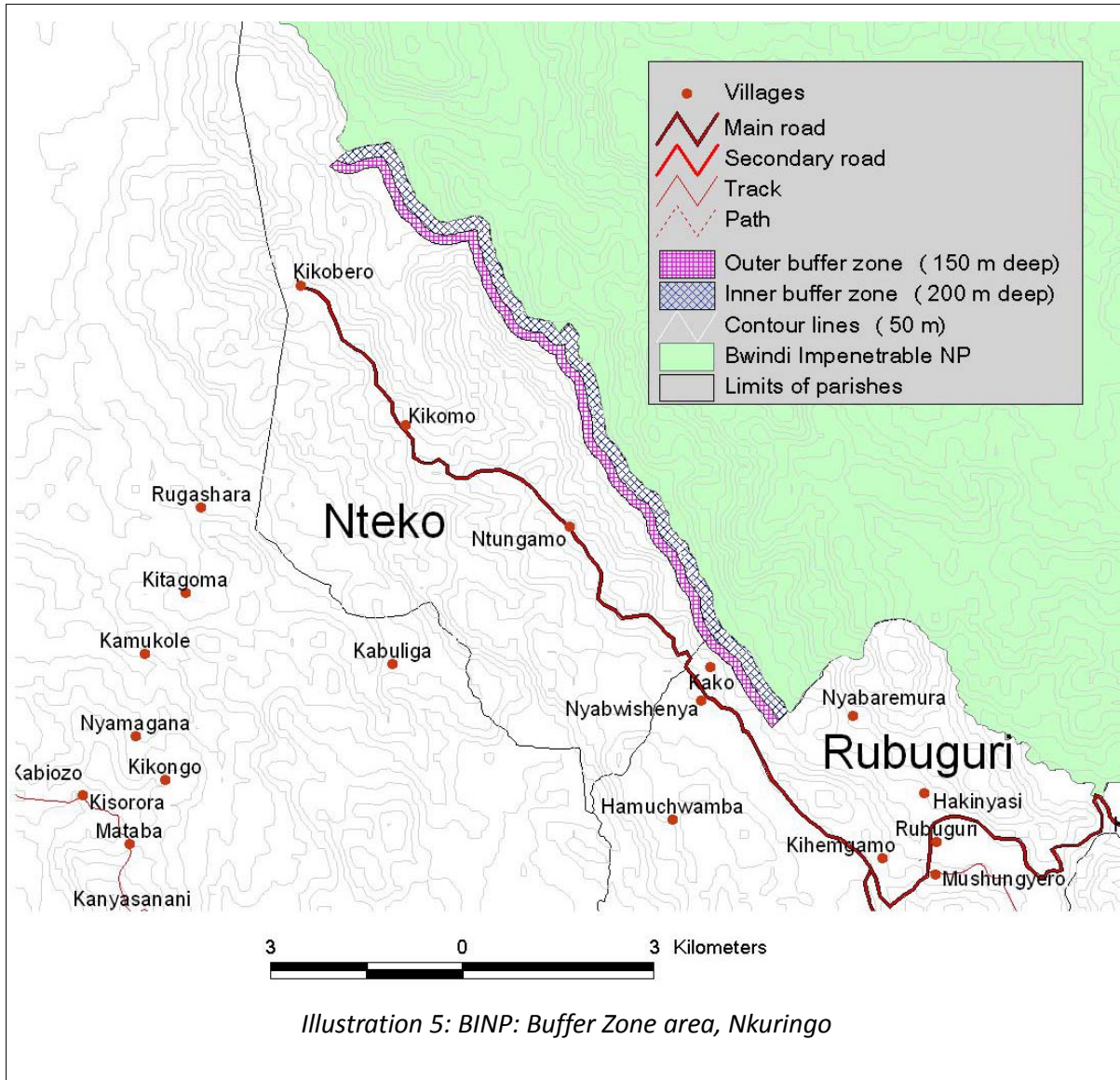
Around Mikeno sector (PNVi) construction of the wall also began in 2002, and a total of 52 km was completed by mid 2007. A subsequent evaluation of the wall around the Mikeno sector gave evidence that not only had the wall helped in reducing crop raiding especially from buffalo but the wall was also limiting encroachment of the park. However, it was observed that animals do destroy the wall mainly in areas not well built or lacking height. IGCP decided then to start upgrading the wall, and two sections were completed by mid 2010, respectively between Mwaro and Gikeri over a distance of more than 5 km, and around Jomba over a distance of more than 4 km. In these sections, the wall was raised to a total height of 1.5 metre. Additionally, a new section of 0.5 km was built towards the border with Uganda (IGCP, 2010). Ultimately, the entire wall on the DRC side will have to be raised and repaired in the near future.

3.4.2 Buffer Zone Management

Buffer zones are blocks of land located between natural forests and cultivated areas that are managed to discourage wildlife from crossing between them. In its broadest sense, a buffer zone should be an area where land-use practices and land management are designed to reduce or prevent human-wildlife conflict. Before land-use changes were implemented at Nkuringo, there was no deterrent to habituated gorillas, which typically ranged up to 1 kilometre beyond the park boundaries (Goldsmith, 2005). In October 2000, a survey was conducted amongst the community in the affected area to solicit their views for and against sale of land. The report indicated that 93.3 % of the respondents were in favour of land sale and following several consultative meetings with the community, the affected community established the amount of land that would be made available for purchase. The piece of land incorporated the range of the Nkuringo group and would extend approximately 350 metres from the park boundary (because this was the most frequently used section of the community land by the gorilla group) and stretch 12 kms along the park boundary. As the Nkuringo group was the only habituated gorilla group which ventured beyond 350 metres from the edge of the park, it was decided that this would be sufficient to significantly address the issues of problem animals, including the Nkuringo gorilla group (IGCP, 2005).

UWA bought the land from the local community with the help of IGCP and other stakeholders. The buffer zone has been divided into a 'community exclusive use sub-zone', which is the outermost 12km by 150m, and an 'actively managed sub-zone' which borders the park (12km by 200m). Activities in the former include problem animal control interventions, research and monitoring, community conservation education, and livelihood improvement initiatives (crop and animal husbandry and community tourism). In the latter subzone, activities include gorilla tracking, research and monitoring, and manipulation of the ecosystem to prevent it from developing into mature forest (NCDF & UWA, 2007).

At the policy level, the buffer zone is under the responsibility of the Joint Management Board, consisting of UWA and the Nkuringo Conservation and Development Foundation (NCDF)¹. Under this structure, the management committee is responsible for the actual buffer zone management, while three sub-committees (Habitat and Gorilla Health; Community Participation and Livelihoods; Monitoring and Evaluation) deal with specific technical issues (NCDF & UWA, 2007).



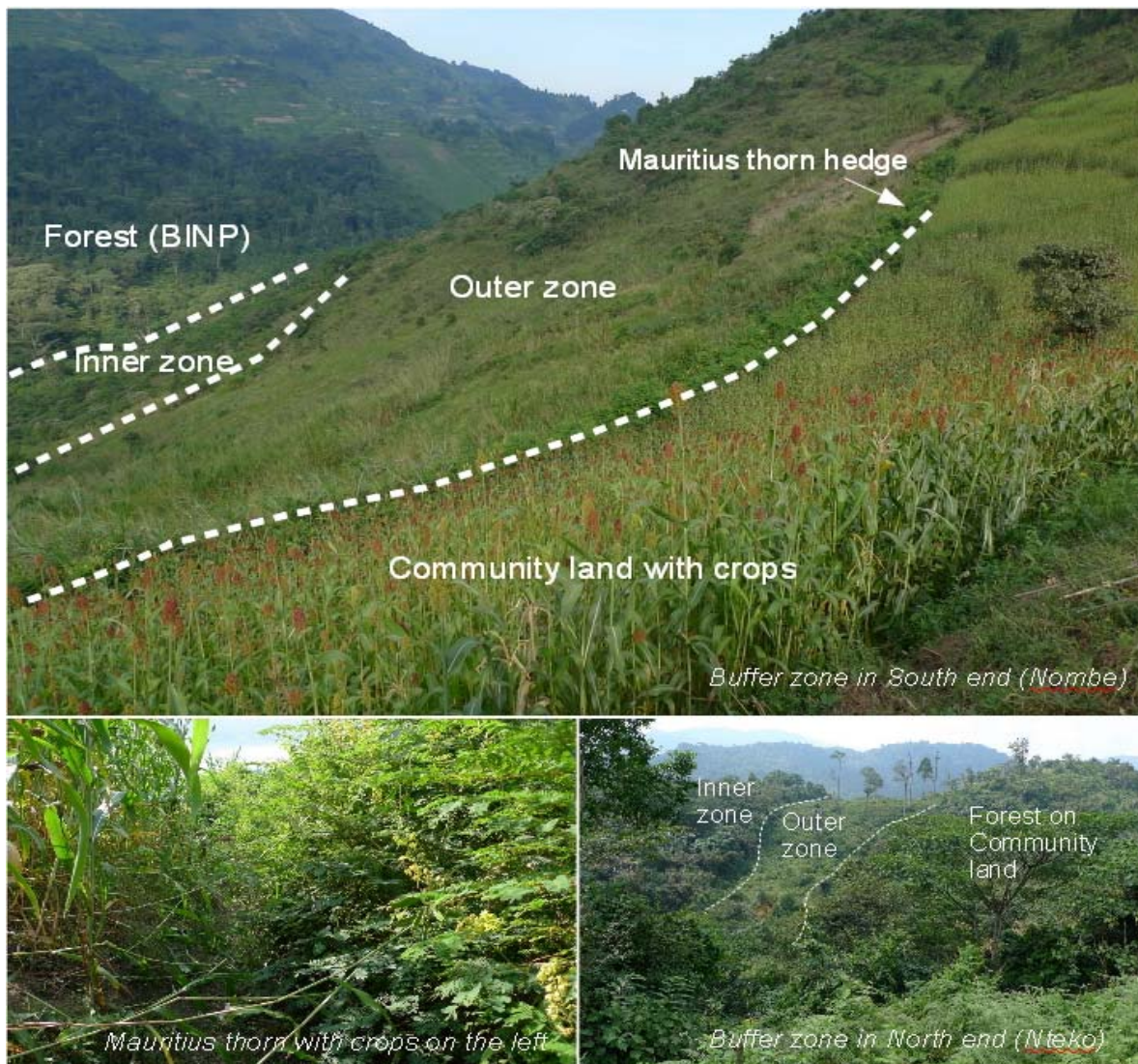
¹ The Nkuringo Conservation and Development Foundation (NCDF) was established in 2004 and is an association registered under the companies' act of the Republic of Uganda. The role of NCDF is to develop community capacities and competencies in the parishes of Rubuguri and Nteko so that they are able to generate a sustainable stream of direct financial benefits through the development of profitable, tourism and non tourism based enterprises thereby contributing to incentives for effective natural resource Management and Gorilla conservation in BINP (<http://www.ncdfuganda.org>).

Box 3: The buffer zone at Nkuringo, BINP

Officially established in 2005, the buffer zone in the Nkuringo area represents practically the only example of a buffer zone next to a protected area in Uganda. Through consultations and negotiations with a wide range of stakeholders, particularly local farmers being affected by problem animals leaving the forest, a total of 423 plots of land totalling 4200 hectares were purchased from 239 individual landowners. Funds were donated by IUCN-Netherlands, Fauna & Flora International and WWF-Sweden, and total payments of about USD 400,000 were smoothly organised between 2003 and 2005.

The land purchased for the buffer zone has been divided into two sub-zones: the inner zone, 12 km along the forest boundary and 200 m deep, is owned and managed by the Uganda Wildlife Authority (UWA), and is supposed to be "deliberately manipulated" so as not to allow it to develop into a mature forest ecosystem. The outer zone, on the other hand, is 150 m deep and is adjacent to community land. The outer zone is co-owned and co-managed by the community of Nkuringo, under NCDF, and UWA.

In 2010 and after several years of testing, it appears that the hedge of Mauritius thorn planted along the outside boundary of the outer zone is the only mechanism that has some relative success in slowing down the movements of wildlife, at least where it is properly maintained, such as in the southern part (see first photo below). Regarding the actual management of the two sub-zones, one can only notice the regeneration of the vegetation, particularly visible in the northern part (see third photo). It is now imperative to find a proper solution which would act as a buffer.



4 Analysis of the theme

4.1 Phases and mechanisms

In its early stages, human-wildlife conflict management has not been the subject of any strategy from the IGCP point of view, however the following phases can be retrospectively described.

Having been intimately involved in tourism development in Bwindi since 1992, IGCP assisted UWA in all aspects of gorilla tracking, including training, organisation, implementation and monitoring. Several years later, it appeared that habituated gorilla groups were coming more and more frequently out of the forest, mainly to raid crops. This led to the establishment in 1998 of the first HUGO groups, initially as a testing phase. The HUGO experience was then extended to other parishes around BINP, and to the Mikeno sector in the Virunga range.

Regarding the buffalo wall in the Virunga range, this was also done over a phased approach, concentrating first on the most problematic sections of the parks' boundaries, and then progressively extended to the whole perimeter. More recently, upgrading of the most critical sections has started to take place in the three countries.

The establishment of the buffer zone in Nkuringo has taken several years, also in a phased approach: statement of the problem and planning, negotiations with the communities, land purchase, testing of various buffer crops and physical barriers such as the Mauritius thorn.

4.1.1 Costs of HWC and BZ management

Over the years, IGCP and its financial partners have invested relatively large amounts of money into human-wildlife conflict solutions. It is estimated that a total of about USD 1 million has been spent in the last 10 years.

For example, for the wall upgrading campaign in DRC in 2009/2010, IGCP paid USD 4 per metre of new wall (0.5 km), and USD 2.5 for the upgrade (about 10 km) to height of 1.5 metre. For MGNP, a stretch of 1.5 km of new wall along the DRC border cost a total of USD 4.65 per metre (Ezuma, 2009).

Regarding the buffer zone in Nkuringo, a total of ca. USD 400,000 was used for the land purchase of 4.2 km² (this sum includes compensation for crops and property, disturbance allowance and bank charges) (IGCP, 2005).

Unfortunately, there is a lack of detailed information regarding the costs of HWC, and it is therefore difficult to carry out a proper financial analysis. If there were more data available, it would be particularly interesting to look at the overall effectiveness of HWC and to compare the costs of the various interventions with the baseline costs of no action.

4.1.2 Socio-economic aspects

As highlighted previously, local communities neighbouring the four protected areas that harbour mountain gorillas pay a high cost, both in social and economic terms. Besides the direct impact of HWC resolution programmes, the establishment of such initiatives in the three countries has also contributed to some direct benefits to specific groups who were involved in their implementation.

In particular, some high-intensity labour activities such as the erection of the buffalo wall have seen the involvement of several thousands of unskilled people, through contracts signed between the communities and park authorities or IGCP. For example, during the recent upgrade of several kilometres of the wall in the Mikeno sector, more than 1200 workers from the community were hired and paid to strengthen or build some portions of the wall (IGCP, 2010). Also recently, a similar exercise conducted around MGNP has involved three groups from the community, each of them being in charge of a stretch of 500 metres (Ezuma, 2009).

Tangible socio-economic benefits exist also for groups of people specialised in routine programmes, like the HUGO groups, which total ca. 150 people between Uganda and DRC, or the "crop rangers" associations in Rwanda, totalling about 600 people. Most of the HUGO members in Uganda have been enrolled in ASCA groups, an informal system of community savings in rural areas (KCBTA, 2009; Pelrine & Kabatalya, 2005).

By belonging to these associations, the members have attained special status in their communities. Finally, the experimental management of the buffer zone in Nkuringo has also brought some socio-economic benefits to the local populations in its 5 villages, although no effort has been undertaken to quantify them.

4.1.3 Institutionalisation and implementation partners

As with most of the activities developed by IGCP, the protected area authorities of the three countries have been instrumental in the implementation of human-wildlife conflict resolution and buffer zone management.

In Uganda, both the buffer zone management in Nkuringo and the HUGO programme have been an integral part of the routine work of the Uganda Wildlife Authority over the years. In Nkuringo, UWA co-owns the outer buffer zone with the community (through NCDF) and the inner zone is a *de facto* extension of BINP (although not officially gazetted). UWA contributes to the HUGO programme mainly by providing food rations to the members and by liaising regularly with them through the Community Conservation Rangers that are deployed in the various patrol posts around BINP. In Mgahinga, UWA is also in constant touch with the community through their specialised personnel.

In Rwanda, RDB has always been on the front stage regarding the construction, the upgrade and the maintenance of the buffalo wall. There are currently a total of 18 associations organised in cooperatives which are active around and in PNV: 12 cooperatives (one for each sector neighbouring the park) consist of former poachers and are involved in assisting the patrols, one is the ANICO group, one gathers all the porters involved primarily in tourism and four are the cooperatives involved in HWC (also called “crop rangers”) (Kwizera & Ndayisaba, 2009). All those associations are now coordinated by RDB, and there is clearly a strong sense of bond between the cooperatives and the institutional partner.

It's probably in DRC where the level of “ownership” of the various initiatives developed with the assistance of IGCP is less noticeable. There is currently no regular system for proper wall maintenance, and the HUGO groups that were put in place a few years ago have now been converted into patrol assistants by ICCN. From the three components making up the Virunga volcanoes range, the Mikeno sector is probably the one facing the most challenges: not only are the socio-economic situation and the security status there the least positive in the three countries, but human-wildlife conflicts around Mikeno are also the most diversified and acute. It's the only place among the four gorilla parks where elephants, buffaloes and gorillas, together are active in crop-raiding, in addition to eucalyptus trees being damaged by gorillas.

4.2 Lessons learned and key findings

Lesson 1: Human-Wildlife conflict has to be viewed in the broader context of cost-benefit analysis

Communities living near protected areas have to bear multiple costs: loss of access to the natural resources in the forest, exposure to crop-raiding animals, and even physical threats to property or human lives. Furthermore, these direct effects are also usually associated with opportunity costs: time spent by the communities to guard the crops or defend their properties cannot be used in other activities that could contribute to their livelihoods or their income-generation, children can often not afford to receive proper education because of their involvement on the farm, etc. Logically, the closer the communities are to the forest, the greater the costs will be (Korbee, 2007).

On the other hand, modern conservation concepts have been advocating for many years the sharing of benefits with the communities living near protected areas. The principle is to have a better balance between the costs incurred by neighbouring communities and the benefits accrued. Ideally, the costs should be kept as low as possible and the benefits higher. In this situation, the communities would have, again theoretically, a more balanced perception of the protected area (Archabald & Naughton-Treves, 2001; Franks, 2008).

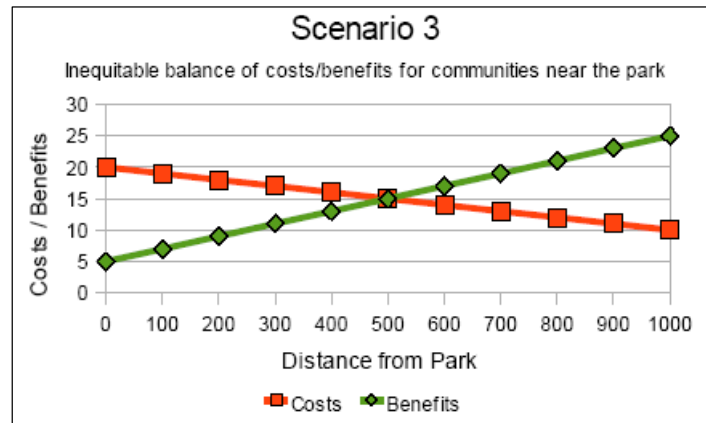
The following graphs show several scenarios with various values of costs and benefits, in relation to distance from a park boundary. In these graphs, figures are indicative and only aim at showing broad trends. The three next graphs have in common that the costs always steadily decline as one moves away from the park boundary, assuming that nothing is done in terms of preventing or mitigating human-wildlife conflicts.



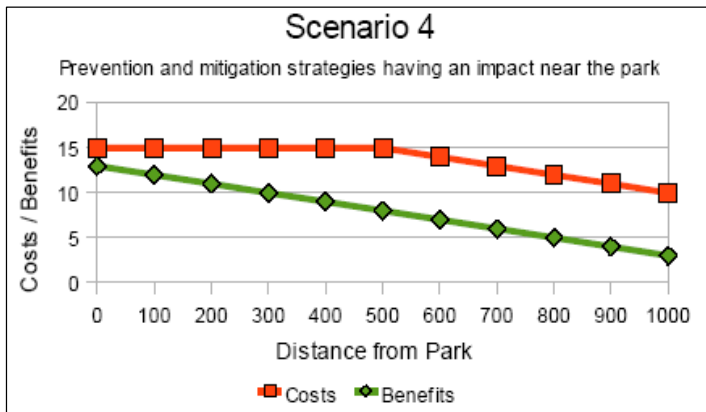
In this scenario, the benefits decrease as we travel further from the park boundary. However those benefits never manage to offset the costs experienced by the communities. In this case, the net result is negative, which can impact on the perception of the people, and generally on their attitude towards the park and its authorities.



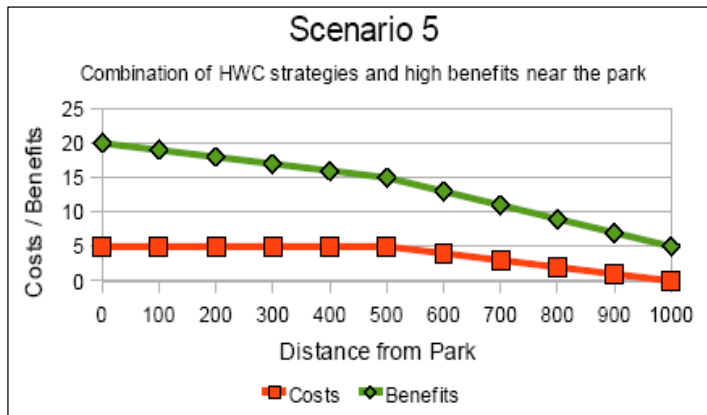
In this case, the benefits increase as we approach the park boundary, and they manage to offset the costs. This is better than in Scenario 1, and should therefore elicit a more positive attitude among the communities. However, there seems to be little success in preventing or mitigating the effects of HWC in this situation.



This scenario is probably the closest to the current situation experienced by the communities around most of the parks. The communities receiving most of the benefits are not the ones living in close proximity to the park, and there is a skewed ratio between costs and benefits. This situation is likely to emphasise the conflicts and impact on the attitudes.



This situation is similar to Scenario 1, but in this case there are HWC strategies that seem to have an impact on the overall costs incurred by the communities immediately adjacent to the park. However, the benefits accrued to the populations cannot offset the costs.



This is probably the ideal situation, where HWC strategies are having a significant impact and benefits are much higher than the costs, while favouring the communities living immediately next to the park. This scenario would probably elicit the best response among the communities, both in terms of attitude and equity.

A general feature observed throughout the region, but also in other parts of Africa, is that the poorest of the communities tend to live near the boundaries of protected areas, where land is usually cheaper and less accessible. Being on the front-line, these communities are also logically bearing most of the costs imposed by the protected areas and suffer the most from human-wildlife conflicts (Blomley, 2003; Blomley et al, 2010; Bush & Mwesigwa, 2008; Sandbrook, 2006; Franks, 2008; CARE et al, 2003).

Many respondents interviewed during this study, particularly the communities or their representatives, complained that a lot of the benefits going to the communities were in fact targeting areas that are too far from the park boundary. There are examples of schools or other infrastructures being built with park revenues or by other conservation programmes are sometimes 5 or 10 kilometres from the park, and where the children of parents living near the boundary cannot even access because their presence on the farms is required for livelihood reasons or they don't have the financial resources to send their kids to schools. This overall impression should probably be verified by more systematic surveys targeting the attitudes of communities in relation to benefits accruing from the forest and conservation programmes.

Finally, one has to bear in mind that "calculating" costs and benefits of a protected area to the neighbouring communities cannot be done entirely on the basis of facts and figures. In any human society, perception to hardship is an individual feature which can be based on many different factors, some of them being purely psychological. The level of tolerance displayed by the community will not only be linked to the potential or real benefits (Romanach et al, 2007), but will also vary according for instance to history and precedents, actual or perceived relationships with leaders or organisations, patience, etc.

Lesson 2: Solutions aimed at preventing or mitigating human-wildlife conflicts have to be carefully and continuously assessed in the long run, through sustained monitoring systems

An observation made during this assessment reveals that very little has been done in terms of monitoring the outcome and impact of the various strategies aiming at preventing or mitigating the human-wildlife conflicts throughout the region. In some places such as at PNV in Rwanda, data exist for some extended periods of time, but have not been entered nor analysed. In general, the lack of quantitative datasets represents a significant loophole in the whole programme: without these, it is extremely difficult to make informed decisions and to properly assess what works and what doesn't, or what the general trends are over time. Personal impressions and qualitative information exist, however, which seem to indicate that human-wildlife incidents are generally on the rise, and that prevention and mitigation measures are, at best, only partially answering the problems while not addressing them in a thorough manner.

Aspects which appear to be crucial in the whole understanding of HWC, and which have not been documented in the long-run include, among others:

- Population dynamics of large mammals or known crop raiders in the Virunga massif: most of the HWC incidents in the Virunga massif involve buffaloes and, to some extent, elephants. For these two species, it is evident that the incidents are on the rise, and there also seems to be a qualitative correlation with their direct or indirect observations made during patrols inside the forest. Even if

some studies have been carried out over the years, mainly by the Karisoke Research Center, they were mainly done by undergraduate students and they lack the depth of time required to perform a proper long-term analysis. This remark is also valid for BINP and the understanding of elephant population dynamics.

- Connectivity of Mwaro corridor: this corridor is known to play a critical role in connecting the Virunga massif with the Nyamulagira sector of Parc National des Virunga. In historical times, herds of buffaloes and elephants, mainly, were regularly observed crossing the Goma-Rutshuru road during what appeared to be seasonal movements. For the past 20 years, the corridor has been subject to intense pressure, starting with the paving of the road in the early 1990s, then the Rwandan refugee crisis in 1994-1996 and then the two Congolese armed conflicts in 1996 and 1998. The main blow to the corridor happened in 1998, when the Congolese army decided to clear the vegetation on both sides of the road, in order to decrease the number of armed ambushes. Coupled with widespread corruption within the army that enabled hundreds of people to cut and sell more trees in this area, this operation led to the complete loss of connectivity of the corridor. Monitoring data of that time show a clear link between this event and a dramatic increase in HWC incidents in the three sections of the Virunga massif. For instance in Rwanda, elephants were seen coming outside of the park and raiding crops, something that have not occurred for more than 15 years. Since then very little effort has been made in trying to understand the relationships between the regeneration of Mwaro corridor, the movements of key species and the occurrence of HWC incidents in the three countries.
- Ecological and social pressures on gorilla groups: there is an obvious trend, observed both in the Virunga massif and in Bwindi, showing that more and more gorilla groups come outside the forests and damage eucalyptus trees and crops. While habituation to human presence and historical occupation of land currently lying outside gazetted protected areas have often been cited as the main reasons for this trend, little is known about food availability issues or social pressure driving some gorilla groups outside their usual home ranges. More recently, Karisoke Research Center has been working on food availability and ecological suitability in its research area (Grueter, pers. comm.) but no such analysis has been carried out on gorillas habituated to tourism. A better insight into these aspects would definitely shed some light on human-gorilla conflicts.
- Distribution and trends of human-wildlife conflicts: Despite having been involved in HWC issues for many years, IGCP and its partners have very little hard information to show in order to document the trends both in terms of distribution and intensity. According to discussions with respondents, HWC incidents seem to be significantly on the increase and spreading, but this observation is mainly based on qualitative impressions rather than real figures or geo-referenced information.
- Costs and benefits to the neighbouring communities: As highlighted in Lesson 1, HWC has to be viewed in the broader context of cost/benefit analysis. A documented and thorough study, whether it is in economic terms or on perception grounds (e.g. attitude surveys), would definitely assist the protected areas and their partners in assessing the impact of HWC strategies at the socio-economic level.
- Economics of HWC and mitigation measures: there exists only fragmentary information on the financial equation of HWC in and around the four mountain gorilla protected areas. The absence of reliable hard data on financial costs makes it very difficult to undertake a proper economic assessment of the various mitigation or prevention measures, or of the no- intervention baseline scenario.

Lesson 3: Solutions designed by humans are constantly challenged by adaptable wildlife. This requires constant vigilance and adaptable solutions by humans, but also basic and sustainable maintenance systems.

A striking observation made during this study is the fact that once a HWC solution has been implemented, its impact lasts for a certain time then fades away, sometimes to be completely obliterated. This can be attributed either to a lack of maintenance and follow-up of the solution, or to counter-solutions found by wildlife species, or, most likely, a combination of both explanations.

An example is the buffalo wall built along the boundary of Volcanoes NP in Rwanda. After the construction of the first version of the wall, the level of crop-raiding observed outside the forest dropped significantly, thus

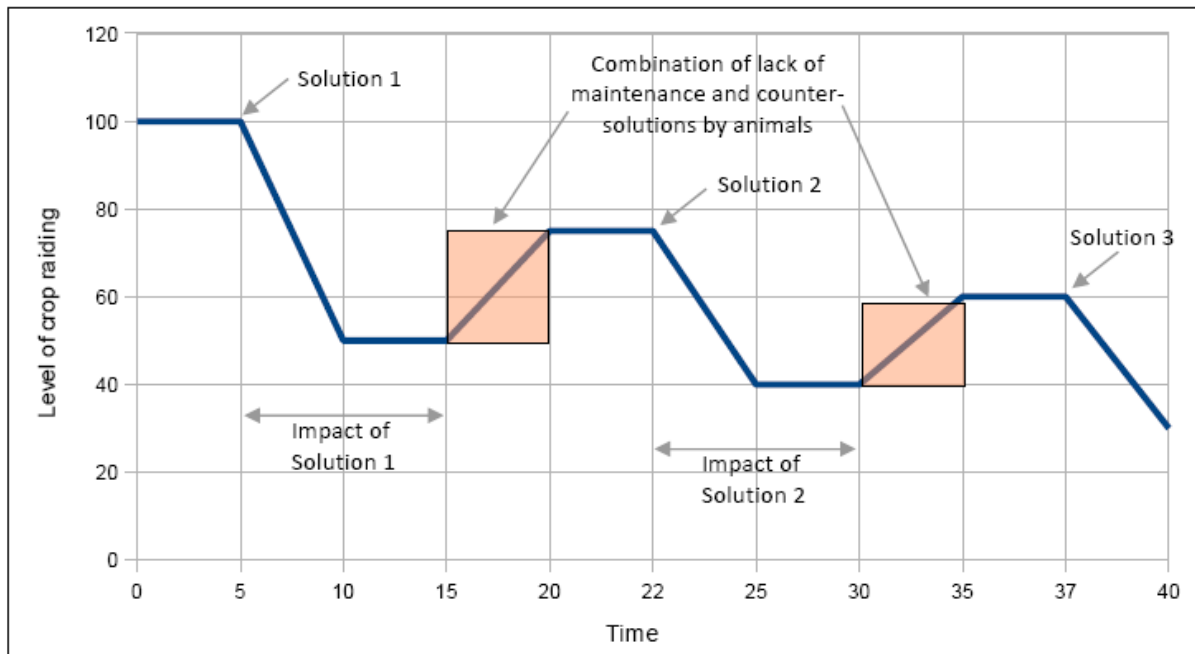
showing that the solution found and implemented had an impact. However after a few months, the level of crop-raiding started to increase again. Buffaloes were seen trying, and succeeding, to find the gaps in the wall, and on the other hand the level of maintenance to the wall, particularly the repairs where it had collapsed, was not properly followed up. It was then decided to dig a trench on the inside of the wall, which had the desired effect of reducing again the level of crop-raiding. But a few months later, it was observed that animals were again coming out, having found again loopholes in the new solution. The current view is that the entire wall should be upgraded to bigger dimensions, some people even suggesting 2 x 2 metres.

What is particularly interesting is to notice that every time a solution is adopted and implemented, most of the people are convinced that it will be the ultimate answer to the problem. We however seem to forget that even wildlife can find its own solutions to obstacles that we put in place, hoping to restrain its movements and adverse effects on crops or human livelihoods.

This lesson can then be broken down into two aspects:

- Never consider that only one solution will solve all problems, as wild animals will always show great adaptation skills in getting around the difficulties.
- If a solution requires regular follow-up and/or maintenance, reliable and long-term systems need to be worked out well before the actual solution is implemented, otherwise it is not worth the investment.

The following graph tries to summarise a sequence of solutions and their outcome over time.



Lesson 4: Land-use practices around protected areas are usually overlooked but could bring about significant changes in decreasing conflicts.

With the exception of the Nkuringo buffer zone, the interface between the two forests harbouring mountain gorillas and the neighbouring communities is a hard one: community land starts where protected area ends, with no transition whatsoever. While designing barriers such as stone walls or trenches can have some impact, the issue of land use in the immediate vicinity of the forest is probably even more crucial to consider. Most of the respondents recognised that land use practices could perhaps be adapted, but it appears that there is still little understanding on how to address this issue in an appropriate way. Where possible, particularly in Rwanda and Uganda, local government structures have an important role to play, for instance by integrating land-use planning and human-wildlife conflict considerations into development plans at district or lower levels. This would necessitate coordination of strategies not only with local government structures, but also with national entities such as ministries of land and agriculture.

In the case of Rwanda, where a new law instituting compensation is under review (Ngoga, Pers. Comm.), there could even be the opportunity to link land use aspects around protected areas to conditions for compensation.

Beyond working out policies and strategies for more sensible land-use planning and crop selection, the main obstacles that appear from the various discussions on the ground are livelihood considerations and traditional resistance. The majority of farmers in the region have very small plots at their disposal and tend to plant crops for subsistence reasons. Influencing crop selection will therefore meet strong resistance where farmers have no alternatives to fulfil their livelihood priorities.

Lessons 5-9: Buffer zone management

A number of specific lessons can be drawn from the experience of the buffer zone in Nkuringo, but these lessons could easily be extended to other aspects of human-conflict management, in Uganda or elsewhere.

In recent years the concept of buffer zone management has emerged as a relatively new, integrated development approach to nature conservation. Buffer zones are seen as an important tool in conserving areas of ecological importance, while at the same time addressing the development issues of the people in the areas surrounding it. Despite its perceived potential, the concept has so far hardly been made explicit within international and national nature conservation and development policies (Ebregt and De Greve, 2000). Some social science authors have even openly accused conservationists of using the concept of buffer zone in order to extend the control of protected area authorities into community land (Neumann, 1997; Laudati, 2010).

Lesson 5: "Participation" of local communities can be envisaged at different levels, but only certain types of participation have a real meaning and a chance of success.

Pretty (1995) describes six distinct types of participation in development projects:

- 1) passive participation, in which people participate by being told what has been decided or has already happened;
- 2) consultative participation, in which people participate by answering questions, with the process not conceding any share in decision making;
- 3) bought participation, in which people participate in return for food, cash, or other material incentives;
- 4) functional participation, in which participation is seen by external agencies as a means to achieve their goals, and people form groups to meet predetermined objectives;
- 5) interactive participation, in which people participate in joint analysis, development of action plans, and formation or strengthening of local groups or institutions; and
- 6) self-mobilization, in which people participate by taking initiatives independently and retain control over how resources are used.

What has become clear is that positive biodiversity outcomes do not emerge with passive, consultative, and bought types of participation (Pretty & Smith, 2004). It's basically the levels 4 to 6 that show the best guarantees of sustainability. Interestingly, the overall feeling from the whole Nkuringo experience seems to indicate that those levels have not yet been reached, with the notable exception of Nyabalemura village, which is technically not inside the buffer zone.

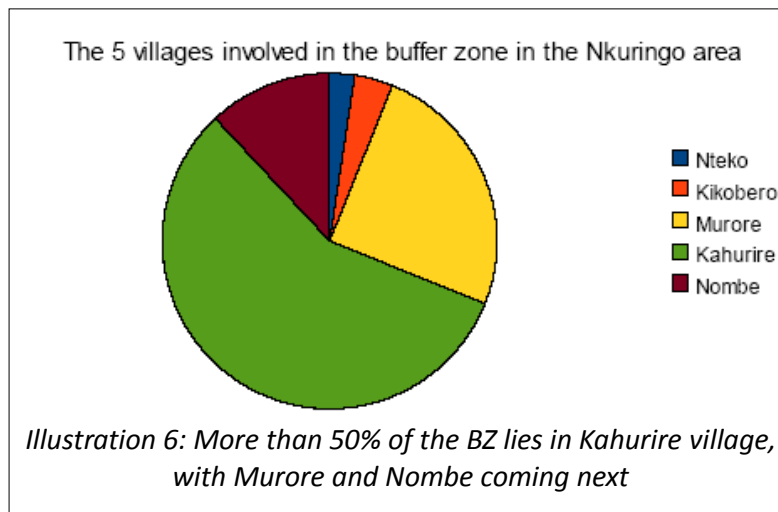
This observation can in turn explain the fact that communities around Nkuringo seem to have generally lost their motivation in the management of the buffer zone. Since 1998, IGCP and its partners have tried and tested a number of strategies addressing the issues of human-wildlife conflict and buffer zone management in the region. Some of these strategies have failed, others still need more follow-up or even look promising, but at the end of the day integrated and effective solutions have not been found yet. In this trial-and-error endeavour, most of the stakeholders have been consulted and involved in testing would-be solutions, which is in itself a very positive feature.

There is however an important caveat: the more solutions that are submitted to the stakeholders over time, the less they become motivated in implementing them. This is particularly true for communities around

Nkuringo, where HWC solutions have been tested for the last ten years. As some respondents put it, they feel they are in a "wheelbarrow which is pushed around by other people", in other words they consider themselves as guinea pigs in a kind of giant experiment. Poor communities which are on the borderline of meeting their livelihood requirements show very high expectations when offered potential solutions, at least in the beginning. Those communities don't necessarily see the difference between trialling a solution and solving all their problems. Interviews with the villages in the Nkuringo area, being individuals or focus groups, clearly show a relatively high level of fatigue. This partly explains why some of the current solutions such as the live hedge sometimes meet so little motivation when it comes to implementation.

Lesson 6: Leadership among local communities has to be properly assessed and secured, and incentives revisited

Five villages have direct stakes in the management of the buffer zone: Nombe, Kahurire, Murore, Kikobero and Nteko (see Illustration 6). A sixth village, Nyabalemura, is located to the south and is not directly in the buffer zone, but has been involved in the numerous meetings and discussions that have taken place since 2002. This village has always expressed an interest in methods and techniques dealing with human-wildlife conflicts, as they experience crop-raiding in the area of the village immediately adjacent to BINP. Under the impetus of the village leader, this community decided to borrow the idea of establishing a live hedge at the park boundary. They approached UWA, who supplied the Mauritius thorn seeds and some fertiliser, and planted the hedge over a distance of 4 kilometres. This barrier is now effective and the communities in this area are happy with the solution. An interesting observation is that the hedge in the Nyabalemura is considered to be the best in the whole area, better than what is being done along the buffer zone by the other villages. This definitely shows that usual incentives, such as equipment or cash, don't necessarily offer guarantees of success but that proper leadership motivated by the interest of the community gives better hopes.



Lesson 7: Once identified and agreed upon, buffer zone objectives have to be thoroughly implemented

According to a literature review done by Martino (2001), there are two antagonistic positions which have been identified when it comes to buffer zones around protected areas. One proposes buffer zones as an extension of national parks and the other argues for buffer zones whose major role is to integrate parks and people. Interestingly, the Nkuringo buffer zone fits these two perceptions, with the inner zone as a *de facto* park extension and the outer zone jointly managed by UWA and NCDF, representing the communities.

The management plan for the buffer zone in Nkuringo (NCDF & UWA, 2007) stipulates as its management goal: "Reducing Human-wildlife conflict while protecting the critically endangered mountain gorilla and contributing to improved community livelihoods". The four following objectives were identified under this

goal:

- reduce crop raiding and other destructive activities by wild animals and enhance the good working relations between local community and park management;
- ensure general well being of the Mountain Gorillas and contribute towards Mountain Gorillas disease control;
- contribute to improved household income for communities adjacent to the park and ensure sustainable use of buffer zone resources;
- promote environmental awareness and community participation in buffer zone management;

Given the lack of objective data, one can only rely on impressions for verifying some of the objectives. Based on community accounts, particularly the “frontline” populations living next to the buffer zone boundary, the level of crop-raiding has not decreased and many even claim that it has worsened (Luseesa, 2008). This in turn has an obvious impact on the “good working relations between local community and park management”.

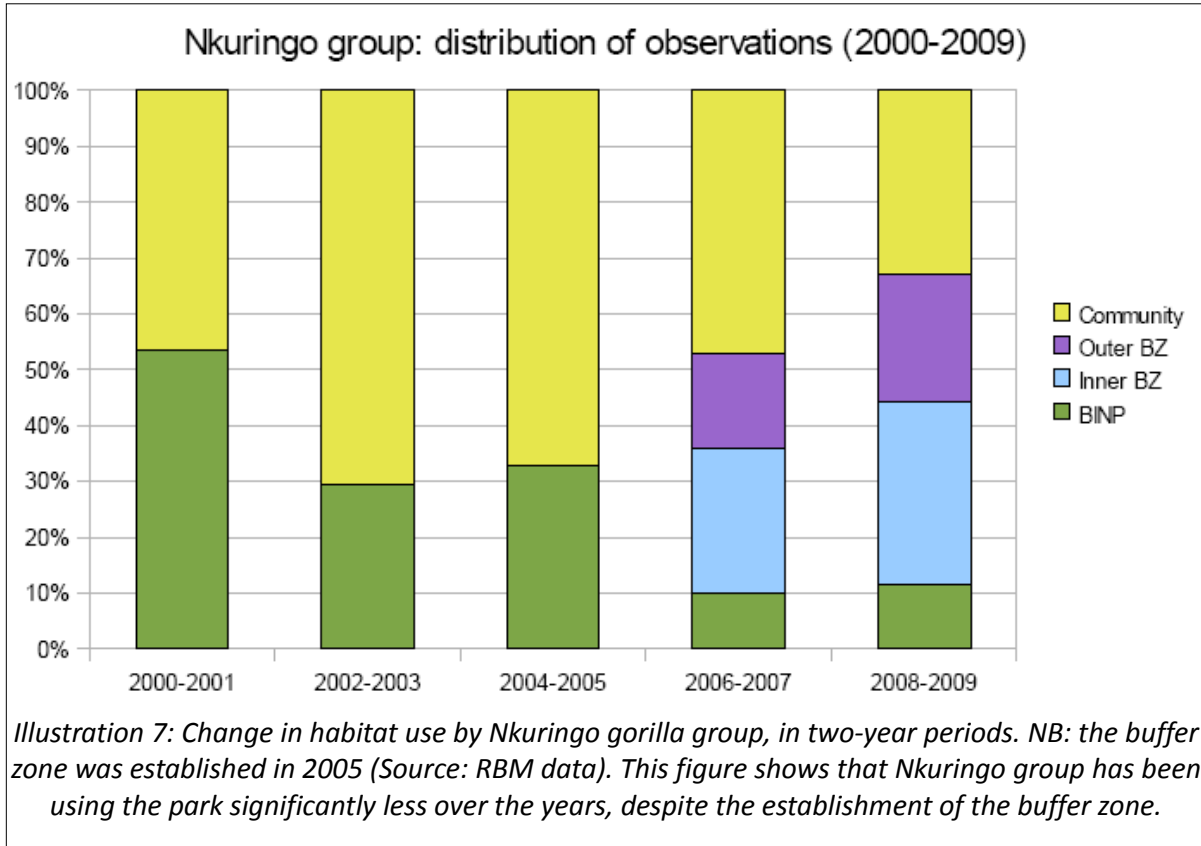
Regarding the second objective, recent home range data seem to indicate that, at least for Nkuringo group, the gorillas are still spending a lot of time outside the park and even on community land outside the buffer zone (see Illustrations 7 and 8). Even if there hasn't been any disease epidemics reported since the scabies outbreak in the late 1990s, the simple fact that gorillas spend a fair amount of their time outside the forest creates potential disease risks for this group.

In the best-case scenario, communities would benefit from the joint utilisation of the outer buffer zone, most notably by planting and harvesting cash crops. Unfortunately, the several attempts made with various crops and land uses have not yet proved “to contribute to improved household income for communities adjacent to the park” (Luseesa, 2008; Andama, 2009). Furthermore, the increase in HWC incidents around the buffer zone is bringing an extra layer of costs to the farmers and their crops.

The fourth objective has somehow been achieved, at least partially. The populations neighbouring the buffer zone have certainly a higher level of awareness, and their “participation” has been relatively high (see the various levels of participation described above). However, it is also clear that the motivation of communities has been declining over the years, as a result of numerous solutions that have been tested and that have failed (Luseesa, 2008).

Referring again to the Nkuringo management plan produced in 2007 and comparing it to the current situation on the ground, the most striking observation is that the inner zone, which was supposed to be “actively manipulated so as to prevent the regeneration of natural forest” has in fact been left to regenerate. This secondary vegetation represents excellent habitat for several wildlife species, particularly gorillas, which are therefore attracted into the area. Even more troubling is the fact that the outer zone, in many areas, is starting to resemble the inner zone, because attempts to cultivate buffer crops have failed and the vegetation is growing.

The unfortunate conclusion to the current state of the buffer zone is that, in the minds of many community members and critics, the park has been effectively extended. Accusations of “encroachment” of the park onto community land (Geisler, 2003; Namara, 2006; Laudati, 2010), until they are denied by corrective actions, will then be difficult to overturn.



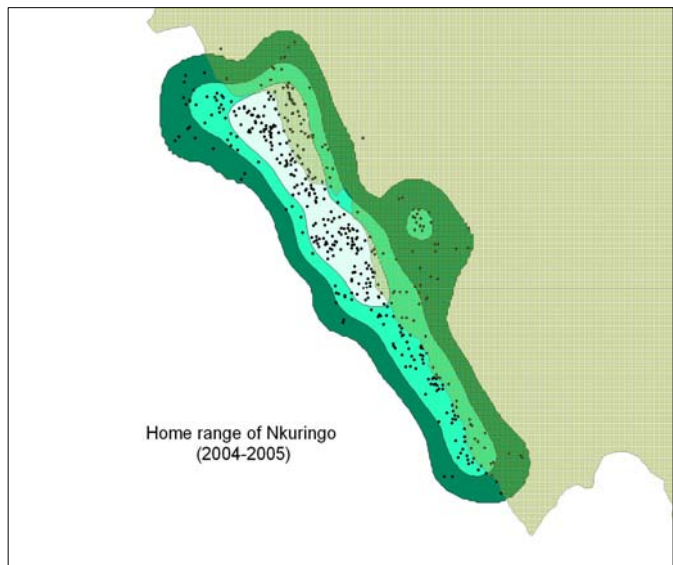
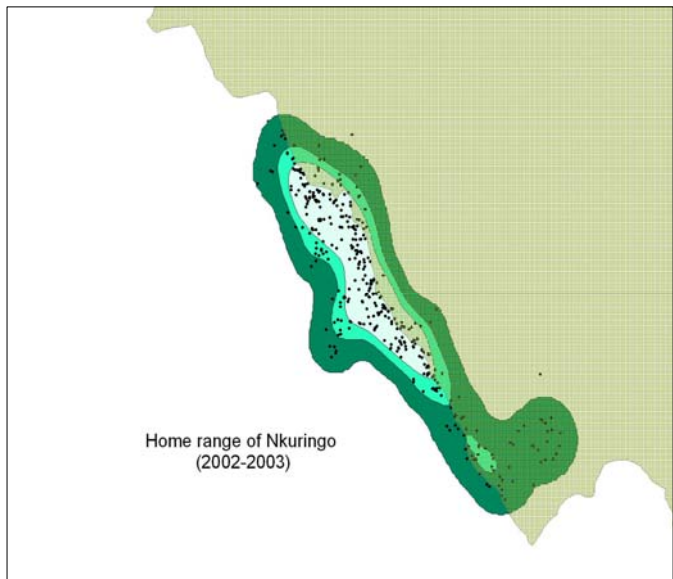
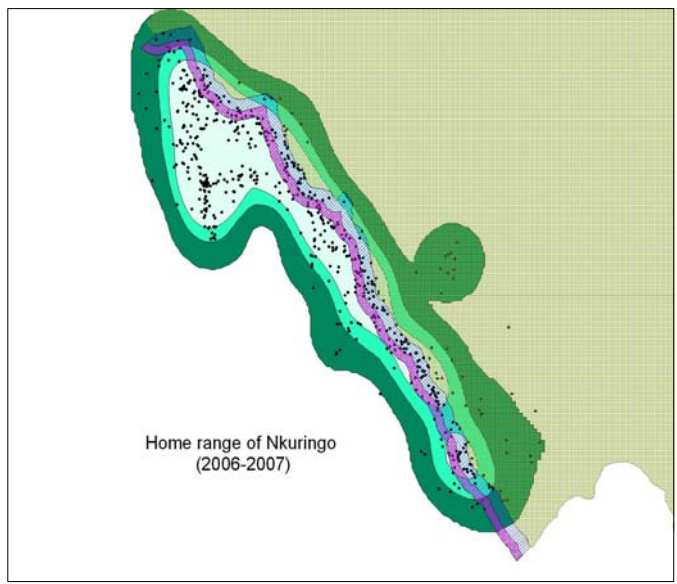
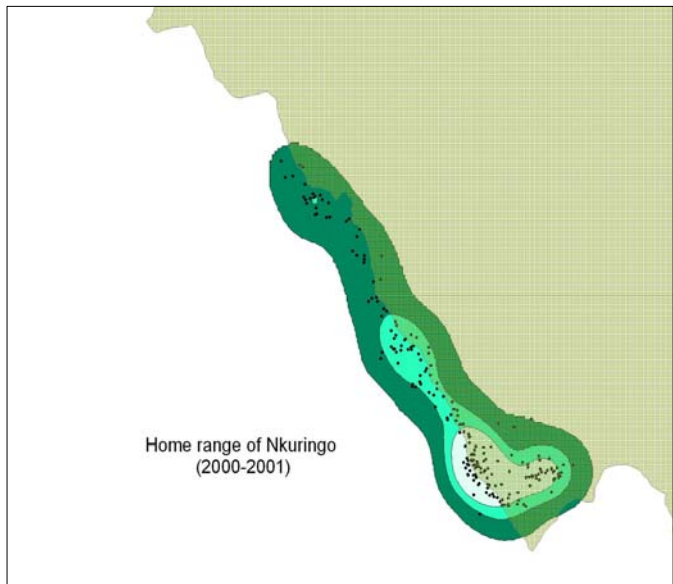


Illustration 8: Two-year home ranging patterns of Nkuringo group, from 2000 to 2009, using Kernel method (50-70-95%) (Hooge & Eichenlaub, 2000). Source: RBM data.

Lesson 8: It is important to listen to communities before embarking on experimental buffer zone programmes

Since 2005, the Nkuringo buffer zone has seen a number of attempts at establishing buffer crops that would achieve the double objective of preventing wildlife from crossing the area and of providing the local communities with income-generating opportunities: wheat, pasture grass, lemongrass and artemisia are among the solutions that have been tested in various parts of the outer buffer zone (Luseesa, 2008). None of these attempts has really worked, either for commercial or marketing reasons (lemongrass and artemisia), or because of technical challenges (wheat and pasture grass). These crops were tested after consultations with the communities, who eagerly accepted to try them with high expectations.

A common feature that emerges from all those negotiations, even before the buffer zone was officially acquired, is that both the communities in Nkuringo and the local government officials at sub-county and district levels have always suggested tea as a good solution for the area. Feasibility studies have been carried out in the past (Luseesa, 2008), showing that the Nkuringo region is perfectly suitable for tea plantations. The long-time presence of the tea factory in Kayonza, on the other side of the forest, indicates on the other hand that this solution is commercially viable in the broad region around Bwindi. The presence of that tea factory has actually led to some heated discussions over the years, when it was proposed to build a road through the forest between Nkuringo and Buhoma in order for the farmers in the Kisoro district to access the processing plant in Kayonza.

At the technical level, many observations, whether it is in the vicinity of BINP (Ishasha area) or around other protected areas in the region (for instance Nyungwe NP in Rwanda and Kahuzi-Biega NP in DRC), show that tea plantations act as an effective buffer crop for great apes (Hockings & Humle, 2009).

In this situation, the community and its leaders have not necessarily been listened to, which has created a double challenge: on the one hand, the favoured solution, which seems to meet all commercial and technical conditions, has not been implemented, and on the other hand and as a result of failed alternatives, momentum and motivation have been lost, thus leading to disappointment and lack of engagement.

A lot of time, money, hope and energy have been used in the process of designing and establishing the buffer zone in Nkuringo. In order not to lose the achievements that have been made, it is perhaps urgent to focus on solutions that have the best chance to succeed, even if those solutions entail a different level of challenge, most notably from the financial point of view.

In order for a tea project in the Nkuringo area to be technically successful and ecologically acceptable, there needs to be a processing plant within a radius of 40-45 km on the southern side of BINP. Identifying the financial resources for such an expensive project should be the first priority for IGCP and its partners.

Lesson 9: Land purchase for conservation is a very complex issue that requires time for proper assessment

Nowhere in Uganda has the acquisition of land for conservation been more active than in Bwindi. The first plots of land were bought from private landowners, mainly farmers, in the Buhoma area in the 1990s. This land was mainly used for establishing the new park headquarters, and there was no real management plan for the area. Since then, the vegetation has re-grown in the parts that were adjacent to the forest, and the park has virtually been extended, enabling several wildlife species, especially gorillas, to expand their ranging. These days, several gorilla groups regularly visit the Buhoma area, raiding crops or foraging right inside the many tourist facilities that dot the place. The trend observed at the beginning of the habituation programme in the early 1990s has therefore been severely aggravated, leading to worsened conflicts with the population but also to a significant increase in the risk of disease transmission between humans and gorillas (Kalema-Zikusoka, 2005). In hindsight, land acquisition in Buhoma and, more importantly, land-use planning and management would have deserved more careful consideration.

In the case of land purchase in Nkuringo, things were, at least in the initial phases of the process, probably better handled. Communities were consulted, a majority (93%) of them willing to sell their plots, and preparation for land acquisition took several years, during which plans for land-use were discussed at all levels. Landowners received good money for their land, and the vast majority of them were happy with the operation, or so was the general feeling at the time. Five years later, the feeling

might be slightly different, with an increasing number of farmers voicing their disappointment and regretting having sold their land. This sentiment has its direct roots in the way the buffer zone has been managed since then, and the fact that HWC has not yet found a real and lasting solution. This situation explains the rather mixed feelings expressed by authors who have reviewed the process and the principle of land acquisition in Nkuringo, some of them being rather negative (Namara, 2006; Laudati, 2010), and others being much more positive (Luseesa, 2008; Martin et al, 2008).

In the case of Buhoma and Nkuringo, assessing the value and merit of land acquisition is therefore a delicate undertaking which at least requires the validation of the principles and objectives at the origin of the operation. This in turn calls for enough time to pass before jumping to any conclusion, being positive or negative.

Should the PAAs and their respective partners in the three countries consider further “land purchase” initiatives in the future – whether it is to increase the size of an area under protection or to establish buffer zones –, it would be worth comparing the merits of “hardcore” land acquisition with the ones of “conservation easements” where the landowner basically retains the property but rents it for conservation purposes (Watson et al, 2010).

5 The way forward

5.1 Opportunities and constraints

5.1.1 Opportunities

Institutionalisation of human-wildlife conflict resolution

A critical aspect, which is in fact valid for any conservation activity but even more essential in the case of human-wildlife conflict, lies in the sustainability of the various resolution initiatives. Everybody agrees that such operations cannot be sustained only through the contributions of external stakeholders such as conservation NGOs or international donors. There are in fact several potential candidates which could play a vital role in the institutionalisation of HWC resolution, especially in Uganda.

Despite the current confusion (see below under “Constraints”), the Local Government (LG) structures in Uganda are legally vested with some important responsibility related to problem animal control (PAC). Furthermore, the recent “Gorilla Levy” system is channelled through the various LG levels, with the provision that at least 15% of the funds coming from this Levy should go to PAC activities. Even if the absolute amounts generated by this mechanism are rather low (USD 5 per gorilla permit are going to the fund), these would at least provide a regular stream of funding for programmes such as HUGO around BINP, or maintenance initiatives for the buffalo wall in MGNP.

As a long-established conservation institution, the Bwindi and Mgahinga Conservation Trust (BMCT) represents another potential partner which could play a role in the stability and sustainability of HWC programmes. The Trust puts a lot of emphasis on marginalised and poor communities around the two PAs where it is active, and HWC affects more the poorest populations directly neighbouring the forests.

In the specific case of Nkuringo, NCDF could also take on some responsibility in directly supporting HWC activities in Nteko and Rubuguli parishes, being through the HUGO groups active in the area or by taking a more proactive role in the management of the buffer zone.

An area which has been recognised as needing particular attention is the systematic documentation of HWC issues: trends in HWC, efficacy and impact of resolution programmes, proximate causes for conflicts, etc. Without an institutionalised long-term monitoring component, trial-and-error projects will remain shots in the dark and elementary questions will be unanswered. Potentially and logically, institutions such as KRC in Rwanda and ITFC in Uganda could play a more permanent role in monitoring those parameters and assisting conservation practitioners in their management decisions.

At the regional level, the Transboundary Executive Secretariat for the Greater Virunga (TES) has also the opportunity to be active in HWC in the three countries. In its 5-year implementation plan, TES has recognised human-wildlife conflict as a priority area (van der Linde, 2009), however this issue has not yet been addressed due to time constraints. A first step identified for this theme is to document as much as possible from outside the region as well as in the geographic scope of TES (Musabe & Nzita, pers. comm.). There is a definite opportunity for TES to progressively evolve as a clearing house for monitoring data coming from the four mountain gorilla parks, including observations on

HWC and its resolution.

Towards a buffer zone around PNV in Rwanda?

There is theoretically already a “buffer zone” around some sections of PNV, a 6-metre belt of trees (mainly Eucalyptus and Grevillea) which have been planted right next to the boundary, at the same time as the buffalo wall. This feature is more a demarcation system than a proper buffer zone, and the communities seem confused as to who can access it and exploit the timber. Moreover, the choice of eucalyptus in some areas is probably not the best option, given that it has the potential to attract gorillas.

For several years now, preliminary discussions have been held at the level of the Government of Rwanda regarding a possible “extension” of Volcanoes NP (van Gils & Kayijamahe, 2009). The extension would be about 3,500 hectares and would basically be a strip of land going all around the park boundary, with a depth that would vary and which would have the least impact in terms of numbers of people to displace. The extension would be left to regenerate and be planted with indigenous trees. A company has been put in place (Great Forest Holding), which will be in charge of the initiative. The scheme would involve the construction of a high-end tourism lodge, to be funded out of carbon credits (Ngoga, pers.comm.). Various levels of the government are involved in the discussions, among them REMA, the National Land Center (NLC), RDB and the carbon trading unit of the Ministry of Environment and Lands.

While there is still a long way to go before any decision is made, certain concerns have been raised, most notably about the fact that several thousands of people, or perhaps more, would have to be displaced, with obvious socio-economic consequences.

At this stage, it looks like no consideration has been made regarding the use of the possible extension as a proper buffer zone, which would then act as a soft barrier between the park and the community. There is definitely a big opportunity which should not be wasted, and if this project goes on, all parties involved should see this extension not only as a way to increase the size of gorilla habitat but first and foremost as a potential solution to the current human-wildlife conflicts. For instance, there could be a proper system that would act as a natural barrier for wildlife, through a combination of non-palatable plant species, thorny shrubs or adequate land use.

Compensation law in Rwanda

The new law on compensation for damages caused by wildlife, which is still in preparation, is another opportunity that deserves particular attention (Republic of Rwanda, 2009a and 2009b). On the one hand, the law and its application orders will probably generate significant challenges for the various authorities which will be in charge of enforcing them, at least in their early stages, without mentioning how the system in Rwanda is likely to heavily affect the debate in neighbouring countries. On the other hand, these legal instruments, which specifically address the long ignored issues of human and property damages caused by wildlife, provide the possibility to influence aspects such as land use around the parks, for instance by linking the compensation for lost crops with clear conditions like the types of crops which are eligible for compensation, the distance of the crops from the park boundary, the measures taken to protect the crops and deter animals, etc. For a country with such strong governance credentials, Rwanda offers a real opportunity to properly address the usual inequities introduced by HWC, but this will require the full cooperation of central and local government structures.

5.1.2 Constraints

Legal and political confusion

In Uganda, The Uganda Wildlife Statute (1996) provides the legal framework for the management of human-wildlife conflicts in Uganda. Section 3 (1) (f) calls for the promotion of ecologically acceptable control of problem animals. The Local Government Act (1997) also gives the responsibility of managing crop-raiding animals that have been declared vermin by the Uganda Wildlife Authority (UWA) to the local government authority at district and sub county levels.

Currently the animal species declared as vermin are Olive Baboons, Bush pigs and Vervet monkeys. Note that within the natural habitat of the animals the term vermin is not recognised. Many animals not scheduled as vermin are legally protected outside the PAs and it remains the responsibility of

UWA to control and protect them. These include animals of international significance such as Mountain Gorillas, elephants, Chimpanzees etc. Important to note is that the Uganda Wildlife Statute (1996) does not provide for compensation to wild animal damages because the policy makers thought the costs would be prohibitive in the long run. Additionally, the affected farmers often over exaggerate the magnitude of crop damage, thereby bringing difficulties in the administration and implementation of such a scheme. The government has however; put in place some indirect mechanisms to benefit the affected communities. For example, through investing back some of the revenue generated from the park for community development projects within the parishes adjacent to the PAs and allowing community access to some of the park resources. Although the responsibility of management of vermin animals is constitutionally vested to the district local governments, they do not have both technical and financial capacity to deal with the problem. Additionally, UWA does not have the capacity to control all incursions into the community by non-vermin animal species. This leaves the affected farmers in dilemma of what options to undertake to protect their property (Andama, 2009).

In Rwanda and DRC, there seems to be less confusion regarding the responsibility in human-wildlife incidents, although the challenges are still very important. The upcoming new law on compensation in Rwanda can however be seen as a double-edge sword, where opportunities will probably equally match the difficulties in implementing it.

Attitudes of local communities

Along with the historical resentment having its roots in the loss of access to natural resources found in protected areas, it is generally admitted that human-wildlife conflicts explain the usually negative attitude of communities towards the national parks in the region.

According to Blomley et al (2010), “vermins” (i.e. baboons, bushpigs and monkeys) and “problem animals” (elephants, gorillas and buffaloes) overwhelmingly represent the main reasons explaining negative attitudes of communities towards BINP and MGNP. On the other hand, it is interesting to note that the issue of crop-raiding was only raised by a few respondents during a survey conducted by Sandbrook (2006) and targeting villages living near tourism hotspots near BINP. There seems to be a clear link between benefits received by some segments of the community and the perception to HWC issues.

Similarly, a recent socio-economic survey carried out around PNV in Rwanda concluded that crop-raiding by wild animals coming out of the park ranked only as a secondary issue expressed by the communities sampled (Bush et al, 2010).

These examples demonstrate how complex the issue of community attitudes is, and how it can interfere with HWC resolution programmes. It takes sometimes only a couple of high-profile human-wildlife incidents, such as crop-raiding by gorillas or community members being wounded or killed by wildlife, to compromise the achievements obtained by long and painstaking integrated conservation and development programmes (Blomley et al, 2010).

5.2 Recommendations

- Implement past recommendations

A number of recommendations that were issued in previous reports, sometimes going back more than 10 years ago, are still valid today as they were not subsequently implemented (for instance: Macfie, 2000 and Musaasizi, 2006). This is particularly true for the aspects of sustainability for the HUGO programme and monitoring of all HWC parameters (see below).

- Identify appropriate solutions for the sustainability of the HUGO programme

In the first few years of its inception, the HUGO programme was perceived as being particularly successful. Today, even if the overall response of gorillas to chasing methods has somewhat been blunted, the simple fact of having a process involving community members who look at that type of conflict is definitely an asset. To make the achievements long-lasting and even more effective, it is high time to address the issue of sustainability once for all. This report has described a few of the options that should be explored at the earliest opportunity, and which would definitely strengthen the programme as an institutionalised mechanism: gorilla levy, NCDF, MBCT or even UWA. The role of IGCP should be to advocate for this solution, and perhaps as a technical advising partner.

In the case of DRC, where the HUGO programme has been somewhat put on hold, IGCP should engage ICCN and look at the options to re-establish an effective conflict resolution programme.

- **Re-establish and maintain monitoring programmes at all levels**

This study has showed how difficult it is to objectively assess what has been done over the years in terms of human-wildlife conflict and buffer zone management, due to the absence of consistent and long-term datasets. This observation covers many facets of the problem: basic ecological answers regarding the main problem animal species, intensity and distribution of crop-raiding incidents, impact of conflict resolution strategies, etc. Without that kind of information, it is impossible to keep implementing projects or validating selected options, let alone convincing political institutions or donors.

Basic monitoring programmes should therefore be restarted as soon as possible in the three countries, in close relation with the usual partners: protected area authorities, research institutions, but also the communities themselves. Particular emphasis should be put on the HUGO programme, where the GRMTs should be given proper training and guidance in the monitoring side of their job description. Empowering HUGO members means the empowerment of the community, who can play a crucial role in not only being a victim of problem animals or vermins, but also in finding solutions. Community-based monitoring tools exist elsewhere (Pouakouyou, 2008), and IGCP should initiate a wide discussion on their possible use around the four gorilla parks.

Specifically for DRC, it is essential to resume the active monitoring of the Mwaro corridor that connects the Nyamulagira sector with the Mikeno sector. Aspects that should be monitored in the long-run include, among others: vegetation cover, movements of key animal species such as elephants and buffaloes, disturbance factors (road traffic, illegal activities, etc.). Understanding the dynamics of the Mwaro corridor will be key not only for Virunga NP but also for the entire Virunga massif straddling the three countries.

- **Look for innovative strategies in addressing human-wildlife conflict issues**

As highlighted in the report (cfr. Lesson 3), successful HWC strategies need to constantly assess the counter-strategies developed by problem animals. This requires constantly questioning the validity of the strategies, and especially their long-term prospects versus the immediate results. In doing so, innovative thinking has to be used and put to the test, while at the same time caution needs to be exerted in order not to raise too many expectations or to assess the long-term sustainability. A recent example is the decision, by park management, to erect an electric fence around the Mikeno sector (Mburanumwe, 2010b). While this decision can appear valid in light of successful cases observed elsewhere, a proper discussion should include technical, financial and social angles.

Sometimes, simple and innovative solutions involving local communities can also have a very positive outcome, and a thorough examination of published or grey literature could already provide valuable leads in potential solutions (Hoare, 2003; King et al, 2009).

- **Consider tea plantations as ultimately the only viable and effective solution for the Buffer Zone in Nkuringo**

From soil suitability studies to commercial and technical prospects, everything seems to indicate that tea plantations in and around the buffer zone would be an effective and viable solution. Instead of testing other potential solutions, for which there is no guarantee they would work better than the ones already tried, efforts should be focused on tea. This solution is financially challenging, as it would require some important investments for the construction of a tea factory in the immediate vicinity of the buffer zone, and it would also require the establishment of large tree plantations for the tea processing. It is however the only option that would meet the double objective of being a buffer crop and offering commercial prospects for the local communities.

Furthermore, if UWA and its partners are not able to “actively manipulate” the inner zone in order to prevent it from growing into secondary forest, the whole of the buffer zone, i.e. the entire 350 metre band, should be used for growing tea. This would also send a strong message to the community, showing a real commitment on the side of UWA.

Even if the tea option appears to be the only lasting prospect that would fulfil the double goal of the buffer zone in Nkuringo, it will probably take some time before the required investments are identified

and such a large scale project is implemented. In the meantime, resources and attention could be directed toward two interim measures: 1) intensify and consolidate the construction and the maintenance of the Mauritius thorn barrier, and 2) make sure that the vegetation doesn't regenerate out of control in the two sections of the buffer zone. The outer zone should definitely be kept as bare and open as possible, while the inner zone should be "manipulated" as mentioned in the buffer zone management plan.

6 Conclusions

Being at the centre of the very delicate cost-benefit conservation conundrum, but also being a very emotional topic, the issue of human-wildlife conflict raises perhaps more questions than answers. For more than 12 years, IGCP has been trying to work out the problems and design solutions, and many challenges have been confronted along the way. Even if some of the challenges are still valid or even more critical, IGCP's work has followed most of the positive features already highlighted in other lessons learned (Martin et al, 2008; Martin et al, 2009).

First and foremost, by trying to tackle one of the most challenging issues facing rural communities in Africa, IGCP is showing once again the strength of its conservation logic. By embedding the local populations in wider scales of activity, IGCP is also demonstrating its long-term principle of participation. The long-term presence of the programme throughout the region has also fostered real partnerships at all levels of the conservation spectrum. By positioning itself as a faithful partner, in particular of the three protected area authorities, IGCP has managed to progressively build a strong base for problem solving, even if it involves taking risks.

On other hand, IGCP needs to focus more on a number of aspects in order to achieve long-lasting results in the area of human-wildlife conflict, such as the relationship between information and practice, the consistent support to solutions that work, or the quest for institutionalised and sustainable strategies.

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Ngendahimana Auleria	LC3 Chair for Nyabwishenya sub-county	Kisoro	Uganda
Ngoga Telesphore	Community Manager, RDB	Kigali	Rwanda
Nsabimana Dese	Chairperson BZ	Nkuringo	Uganda
Nsengiyumva Pierre-Célestin	President, SACOLA	Nyange	Rwanda
Nshekamaba M.	Chairperson BZ Kahuriire	Nkuringo	Uganda
Ntezimana Innocent	President, KOTIMU	Kinigi	Rwanda
Ntibiringirwa Joseph	CCR, MGNP-UWA	Ntebeko	Uganda
Nyirabatanbana Consolée	Treasurer, ANICO	Kinigi	Rwanda
Nzita Maxime	Deputy Executive Secretary, GVTES	Kigali	Rwanda
Paturika Musinyuzi	HUGO member, Iraro	Buhoma	Uganda
Phenerasi Sunday	HUGO chairman, Nkwenda	Buhoma	Uganda
Ramer Jan (Dr)	Regional Veterinary Manager, MGVP	Musanze	Rwanda
Rurangwa Eugène	Transboundary Manager, IGCP	Kigali	Rwanda
Rutagarama Eugène	Director, IGCP	Kigali	Rwanda
Rwarinda Demiano	Chairperson, BZ Committee, NCDF	Nkuringo	Uganda
Scholte Paul (Dr)	Principal, Kitabi Wildlife College (email contact)	Kitabi	Rwanda
Shamavu Papy	WCS	Goma	DRC
Sinaribonya Joseph	Chairperson BZ	Nkuringo	Uganda
Sindubaka John	Chairperson LC1 and Chairperson BZ	Nkuringo	Uganda
Tibesigwa John Justice	Senior Warden, community conservation, BINP-UWA	Buhoma	Uganda
Tindyebwa Nathani	HUGO chairman, Iraro	Buhoma	Uganda
Tugumisirize Deus	Ranger in charge, UWA Ruhija	Ruhija	Uganda
Tukamuhebwa Christopher	BZ Committee member, NCDF	Nkuringo	Uganda

Tumuheirwe B John	LC3 Chair for Kirundo subcounty	Kisoro	Uganda
Tumusiime Norah	BZ Committee member, NCDF	Nkuringo	Uganda
Tumusime Rusiya	Chairperson BZ	Nkuringo	Uganda
Tumwebaze Gervase	Chairperson, NCDF	Nkuringo	Uganda
Tumwesigye Charles	Conservation Area Manager, BMCA-UWA	Kisoro	Uganda
Turyamureba Henry	HUGO Secretary, Kashasha	Ruhija	Uganda
Turyasingura David	HUGO Secretary, Kiyebe	Ruhija	Uganda
Tuyisingize Deogratias	Biodiversity Program Coordinator, Karisoke Research Center	Musanze	Rwanda
Twesigye Alfred	Executive vice-chair, NCDF	Nkuringo	Uganda
Twinomugisha David	HUGO Member, Nteko	Kikobero	Uganda
Twinomugisha Deus	CCR, UWA Nkuringo	Buhoma	Uganda
Twinomugisha Vincent	HUGO Member, Kitojo	Ruhija	Uganda
Uwamahoro Julienne	Executive secretary, Gahunga sector	Gahunga	Rwanda
Uwingeli Prosper	Chief Warden, PNV-RDB	Kinigi	Rwanda
van Heist Miriam (Dr)	Co-Director, ITFC	Ruhija	Uganda
Wright Jonathan	Director, The Ugandan Safari Company	Nkuringo	Uganda
Wright Pamela	Co-Director, The Uganda Safari Company	Nkuringo	Uganda
Zerekana Silverio	HUGO Member, Kitojo	Ruhija	Uganda

9 Maps



Illustration 10: The Virunga-Bwindi region