HUMAN-WILDLIFE CONFLICT MANAGEMENT: EXPERIENCES AND LESSONS LEARNED FROM THE GREATER VIRUNGA LANDSCAPE

PREPARED FOR THE
GREATER VIRUNGA TRANSBOUNDARY COLLABORATION SECRETARIAT WITH FUNDING FROM THE NORWEGIAN EMBASSY, KAMPALA, UGANDA

BY
Dennis Babaasa, Emmanuel Akampulira and Robert Bitariho
INSTITUTE OF TROPICAL FOREST CONSERVATION
MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY, UGANDA
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EXECUTIVE SUMMARY

This study was conducted by the Institute of Tropical Forest Conservation (ITFC) of Mbarara University of Science and Technology, Uganda, with the support of the Greater Virunga Transboundary Secretariat, based in Kigali, Rwanda. The main objective of the study was collect and synthesize information about the experiences and lessons learned on Human-Wildlife Conflict management in the seven protected areas of the Greater Virunga Landscape - Semuliki, Rwenzori Mountains, Queen Elizabeth (including Kyambura and Kigezi Wildlife Reserves), Bwindi Impenetrable, Mgahinga Gorilla National Parks in Uganda, Volcanoes National Park in Rwanda, and Virunga National Park in DR Congo.

Information on Human-Wildlife Conflict management experiences and expertise of the various stakeholders from the different sites is scattered in published scholarly literature, unpublished documents and reports, some already archived or obscure, or the information is "stored" in the great minds of individuals who initiated and/or implement the Human-Wildlife Conflict mitigation programs. These useful and informative sources are extremely hard to access, making it exceedingly difficult to know what has been done and where, the successes, challenges and lessons learned on Human-Wildlife Conflict management. There is virtually little or no coordination among the sites implementing the Human-Wildlife Conflict interventions. Lack of coordination sometimes results in protected area managers unknowingly repeating the same mistakes in Human-Wildlife Conflict management that have been committed elsewhere and also makes the scaling up of successful Human-Wildlife Conflict reduction strategies near to impossible. Given the politically volatile nature of the conflict between humans and wildlife, there is an urgent need to synthesize and summarize the existing information on the experiences and lessons learned on Human-Wildlife Conflict management so that the information can be easily accessed and disseminated to the stakeholders so as to inform management efforts on reducing crop/livestock loss, injuries or deaths due to wildlife, form a basis for collaboration among the different protected areas managers, and formulation of appropriate policy on Human-Wildlife Conflict.

The three countries in GVL have different wildlife policies and laws. Their evolution is linked to the different governance histories that date back to the colonial period in the early 19th century when protected areas were established and the post-establishment war and insecurity that have bedeviled each country at different time periods in the last 50 years. Today, the participation of local populations and authorities in the management of Human-Wildlife Conflict is

being formalized and institutionalized in Uganda and Rwanda compared to DR Congo where participatory management is still in its infancy. Such difference in policy and legislation and their evolution creates difficulty when it comes to managing problem animals in transboundary protected areas. Rwanda has amended its wildlife laws to cater for compensation due to damages and injuries caused by wildlife. In DR Congo, a ministerial directive has been made to ICCN to look into the modalities of also implementing a compensation scheme.

In spite of all the protected areas lying in the same region, the Human-Wildlife Conflict situation varies among the three countries and the seven protected areas. The interaction between wildlife and people is correlated to factors like the ecology of the protected areas - vegetation/habitat type, topography, animal composition, distribution and population density, and human related issues like land use, social-economic/cultural conditions, population distribution and density on areas that border the protected areas. We, therefore, made a situational analysis of Human-Wildlife Conflict specific to each protected area based on information available in the last decade or so. In Queen Elizabeth, Uganda, elephants are the major problem,
Bwindi, Uganda, it is the elephants, baboons and habituated mountain gorillas, Mgahinga, Uganda, buffaloes are the major raiders, while in Rwenzori Mountains, Uganda, it is the bush pigs and monkeys. In the Semuliki, Uganda, baboons and buffaloes are the main problem animals, in Virunga, DR Congo, it is the elephants and buffaloes, whereas in Volcanoes, Rwanda, it is the buffaloes and habituated mountain gorillas.

A variety of strategies are in use around the protected areas in GVL in an attempt to physically deter wildlife from crossing over to cultivated fields and/or by increasing public tolerance for wildlife. The interventions vary from protected area to protected area depending on animal species, farming systems and strategies, measures that have been tested and accepted by local communities, and biophysical features of the area/site. The physical deterrents include: trenches dug along park boundary in Queen Elizabeth and Volcanoes targeting non-jumping animals like elephants and buffaloes; the stone wall in Mgahinga, Virunga and Volcanoes aimed at non-jumping animals, especially buffaloes, live fence using Mauritius thorn in Bwindi to prevent baboons, bushpigs, gorillas and elephants from leaving the park; red chilli depends on its odour to repel elephants in Bwindi; occupied bee hives used in Queen Elizabeth to repel elephants when the insects are disturbed or when the elephants hear their buzzing sound; scare shooting practiced in all the parks to scare elephants, buffaloes and baboons when they are already raiding crops; human guarding practiced by the local communities to chase or scare all raiding animals

from their crop fields; chasing/herding the problem animals, especially the gorillas, by the community based associations in Bwindi, Volcanoes and Virunga; traps constructed using poles, ropes and grass to make enclosures to trap baboons in Bwindi; the buffer land (12km × 350m) to the south of Bwindi to prevent habituated gorillas from physically attacking people and crop-raiding; buffer crops around Bwindi where unpalatable crops to wildlife like tea are planted along the park boundary to prevent all the problem animals; electric fences in Virunga to prevent habitual elephant raiders. Strategies for raising public tolerance of wildlife damage include compensation schemes, tourism revenue sharing with communities living adjacent the parks, selected and limited use of park resources like medicinal plants and basketry fibre by local communities; and community outreach and communication which is done in conjunction with all the interventions.

Cost-effectives of each intervention was determined largely from literature and perceptions of protected area staff. The *buffer zone* was more cost-effective when compared to other alternatives. Though the cost of acquiring land was very expensive, it has greatly reduced human-gorilla conflict. If tea is eventually planted on the land, it will provide an extra income to the local people. *Trenches* are financially justified but only in areas with high frequency of animal raids and large losses to the larger and more destructive mammals such as elephants because of high costs of excavation and maintenance. *Human guarding* is the least cost-effective intervention as only a few spots can be guarded, is labour intensive, partially effective, and involves high social costs and health risks to people and wildlife. The *live fence* using Mauritius thorn is highly cost-effective but is regarded as highly invasive and needs proper management. The stone wall is also highly cost-effective as it is set up using local materials and labour. However, it does not deter elephants and primates. *Community-based associations* for controlling problem animals (ANICO, Crop rangers, HUGO) voluntary nature makes it one of the most recommended interventions around the GVL provided the voluntary spirit can be maintained.

OPPORTUNITIES

- There is now a wide range of Human-Wildlife Conflict mitigation tools and techniques that has been piloted and proved to be effective in deterring majority of the problem/vermin animals;
- Problem animal control is now being formalized and institutionalized as an integral part of Protected Area programs like law enforcement and tourism;
- National governments are showing relative interest in Human-Wildlife Conflict by bringing in the much required resources/support;

- There is a greater likelihood of improved livelihoods, food security and reduction in poverty by the local people being able to fully utilize their land after reduction in frequency of animal raids;
- Reduction in crop loss and injuries/deaths due to protected animals has a great potential of improving relationships between protected area management and local communities
- Community-based problem animal control associations provide a stable forum for regular dialogue and negotiation between community representatives and protected area authorities even for other issues not related to Human-Wildlife Conflict management;
- There are plans or ongoing research to determine what makes habituated mountain gorillas move and spend more time out of the parks than they did only a few years ago.

LESSONS LEARNED

- No single intervention is a stand-alone solution to Human-Wildlife Conflict
- Having an intervention in place does not entirely eliminate the animal raiding problem but could merely divert it elsewhere;
- Local communities need to be involved in the process of selecting a mitigating intervention before it is implemented for them to own it;
- Problem animal control being a collaborative, participatory, community endeavor can act as a bridge for protected area management to deal directly with local communities;
- Three factors lead to the acceptance and effectiveness of an intervention : real reduction in crop loss and injury to local people, education and sensitization leading to improved understanding of the conflict resolution process and the real and perceived benefits to individuals and the communities in general;
- Protected area managers are better equipped to define appropriate management responses by understanding the local perceptions regarding crop raiding;
- Most of the interventions require a shared or collective response from those affected. Given that majority of the local farmers have small land holdings adjacent the parks, they need to cooperate in order to have a deterrent effective;

- Raiding is an emotive issue around all the protected areas in GVL and people are prone to exaggerate the impacts they face either in hope of compensation or as a way of expressing their dislike for the existence of the protected areas

RECOMMENDATIONS

The following are suggestions and recommendations we synthesized from the information we collected:

- Community members affected by problem animals (and by extension the intervention) should be clearly and urgently identified. They should be the focus of all discussions;
- Revenue sharing funds should be channeled into issues that are directly linked to wildlife such as the Human-Wildlife Conflict prevention and mitigation measures as a matter of priority rather than common good community projects;
- A special fund should be created for compensating human injuries and deaths. These are not so common but need to be promptly addressed;
- No Human-Wildlife Conflict intervention should be implemented without full participation of the local community whom it is intended to assist;
- Monitoring data collection and analysis especially recording of animal raids, where they occur, and amount of damage need to be improved;
- There is need to train and motivate a few selected people from the local community based groups to do the data recording;
- Scientific research need to be undertaken on changes in the vegetation inside and outside the protected areas - biomass, nutrient status, structure etc to understand why some wildlife like gorillas that previously used not to come out of the forest are doing so now;
- The interventions and related activities being undertaken need to be grounded in official policy, laws, or guidelines;
- Long-term incentives need to be devised to keep the voluntary spirit of the community based associations;
- For any compensation scheme to be successful, the following need to be in place before the scheme is implemented: prompt and fair payment, sufficient and sustainable funds, clear rules and guidelines, including strong institutional support and site specificity to cater for differences in raiding species and culture specific issues;

- There is need for a compensation scheme to be locally administered. To try to avoid the pitfalls of centralized compensation (low government funding, resources to verify rising claims, monetary inflation etc) the model should be designed to operate around community-based organizations that are partially based on community-funded financial schemes;
- There is need to formulate land use policies or reform existing ones to discourage agricultural expansion, and human settlement in lands adjacent to protected areas and establish wildlife corridors between the protected areas;
- Lastly, there is need to look into ways the vermin/problem can be made to instead generate revenue. Activities like sport hunting of these animals or adding value to trophies derived from these animals need to be explored;
- Interventions to be implemented for each protected area are suggested.

1. INTRODUCTION

This report is a product of a study undertaken in October 2012 to review the Human-Wildlife Conflict situation and management in the seven contiguous protected areas of the central Albertine Rift, a region usually referred to as the Greater Virunga Landscape (GVL). The protected areas are: Semuliki, Rwenzori Mountains, Queen Elizabeth (including Kyambura and Kigezi Wildlife Reserves), Bwindi Impenetrable, Mgahinga Gorilla National Parks in Uganda, Volcanoes National Park in Rwanda, and Virunga National Park in DR Congo (Figure 1). The study was undertaken by the Institute of Tropical Forest Conservation (ITFC), a research and monitoring field station of Mbarara University of Science and Technology (MUST), Uganda, and was underwritten by the Greater Virunga Transboundary Collaboration Secretariat (GVTCS) based in Kigali, Rwanda.

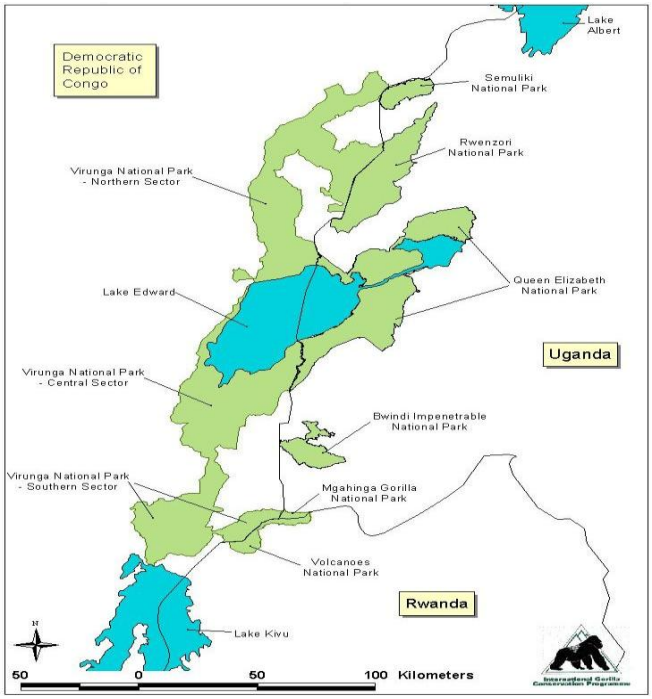

Figure 1. The Greater Virunga Transboundary Protected Areas in the Central Albertine Rift
Source: IGCP (2007)

1.1 Rationale

Human-Wildlife Conflict has been a major conservation problem in the Greater Virunga Landscape (GVL) for decades. The diverse assemblage of wildlife, some large-bodied, living in groups and wide-ranging such as buffaloes, elephants, Vervet and Redtail monkeys, baboons, chimpanzees, bush pigs and mountain gorillas, concentrated in the protected areas surrounded by densely settled agricultural human landscapes is a recipe for conflict between humans and wild animals (Hill *et al.* 2002). This condition poses a serious risk to wildlife survival and human livelihoods in the landscape and ultimately makes the achievement of

the balance between biodiversity conservation and human development increasingly difficult.

Some of the main drivers of Human-Wildlife Conflict in the GVL are (Muhweezi 2011):

a) Crop raiding occurring mainly in the frontline villages;
b) Retaliation against wild animals in response to damage/losses caused by problem/vermin animals, thus undermining conservation efforts and tourism activities;
c) Fear of wild animals (elephants, gorillas, lions, buffaloes), resulting into displacement of people;
d) Destruction and contamination of water sources by wildlife located outside or inside the parks
e) Disruption of social/economic and education activities when people/youth are deployed to guard crop gardens instead of engaging is other social/economic activities or attending schools;
f) Disruption of freedom of movement by wildlife especially along roads in protected areas;
g) Disease transmission at the human-wildlife-livestock interface;
h) Lack of direct benefits (sharing cash payments) from tourism revenues e.g., when mountain gorillas are tracked by tourists on privately owned land.
i) Threat to or loss of human life both inside and outside the protected areas;
j) Loss of livestock to carnivores, especially the large carnivores; and
k) Destruction to investments e.g., chimpanzee raid and destroy bee hives for honey.

A lot of time, effort and resources have been spent preventing and mitigating Human-Wildlife Conflicts in the GVL so that the wildlife managers have a variety of tools at their disposal to help prevent and mitigate the impacts of the problem. However, information on Human-Wildlife Conflict management experiences and expertise of the various stakeholders from the different sites is scattered in published scholarly literature, unpublished documents and reports, some already archived or obscure, or the information is "stored" in the great minds of individuals who initiated and/or implement the Human-Wildlife Conflict mitigation programs. These useful and informative sources are extremely hard to access, making it exceedingly difficult to know what has been done and where, the successes, challenges and lessons learned on Human-

Wildlife Conflict management. There is virtually little or no coordination among the sites implementing the Human-Wildlife Conflict interventions. Lack of coordination sometimes results in protected area managers unknowingly repeating the same mistakes in Human-Wildlife Conflict management that have been committed elsewhere and also makes the scaling up of successful Human-Wildlife Conflict reduction strategies near to impossible. Given the politically volatile nature of the conflict between humans and wildlife, there is an urgent need to synthesize and summarize the existing information on the experiences and lessons learned on Human-Wildlife Conflict management so that the information can be easily accessed and disseminated to the stakeholders so as to inform management efforts on reducing crop/livestock loss, injuries or deaths due to wildlife, form a basis for collaboration among the different protected areas managers, and formulation of appropriate policy on Human-Wildlife Conflict. Against this background, the GTVCS tasked ITFC to compile and synthesize the existing information on Human-Wildlife Conflict management in the GVL. This report provides a synopsis of protected area managers' and conservationists' experiences and lessons on Human-Wildlife Conflict management over the last decade with specific recommendations for further improving the management of the conflict.

1.2 Scope of the Study

This was largely a desk study, but with a 10-day field excursion to different protected areas, to synthesize and compile information on the efforts made to reduce on Human-Wildlife Conflicts around the protected areas of the GVL. The study specifically:

i. Presents the national policy and legal framework on Human-Wildlife Conflict management for each of the three countries in the GVL;
ii. Documents the current status of Human-Wildlife Conflicts in each protected area in the GVL;
iii. Provides a synopsis of the interventions that have been applied to each protected area to mitigate Human-Wildlife Conflicts;
iv. Assesses the cost-effectiveness of each Human-Wildlife Conflict mitigation intervention
v. Summarizes the experiences and lessons learnt on Human-Wildlife Conflict management; and
vi. Suggests what could be done to further reduce conflicts between people and wildlife.

1.3 Study Methods

The following activities were undertaken:

i. Reviewed published scientific literature and unpublished reports on human wildlife conflict management from key stakeholders included but not limited to protected area authorities, NGOs and local authorities involved in Human-Wildlife Conflict;
ii. Consulted and held unstructured interviews and discussions with some of the protected area staff and other conservation organizations' field staff, a few local community leaders/representatives and individual researchers (Annex 1) on Human–Wildlife Conflict and interventions undertaken to address the problem using the question guide (Annex 2).
iii. Made field visits to a some sites where Human-Wildlife Conflict control interventions have been tried/implemented;
iv. Documented the extent of the Human-Wildlife Conflict in the region, strategies so far tried and their successes and constraints;
v. Summarized of the different interventions (and their combinations) and their effectiveness in addressing human–wildlife conflicts; and
vi. Validated, improved and refined our preliminary assessments and recommendations of Human-Wildlife Conflict deterrents by making a presentation to and discussing with protected area managers, conservationists, researchers and representatives of the local communities at a GVTC biannual meeting.

2. THE POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK FOR HUMAN-WILDLIFE CONFLICT

The three countries in GVL have different wildlife policies and laws (Kalpers *et al.* 2010). Their evolution is linked to the different governance histories that date back to the colonial period in the early 19th century when protected areas were established and the post-establishment war and insecurity that have bedeviled each country at different time periods in the last 50 years. Today, the participation of local populations and authorities in the management of Human-Wildlife Conflict is being formalized and institutionalized in Uganda and Rwanda compared to DRC where participatory management is still being developed. Such difference in policy and legislation and their evolution creates difficulty when it comes to managing problem animals in transboundary protected areas. The following policies apply to Human-Wildlife Conflict management in each country.

2.1 UGANDA

The wildlife sector is currently governed under Uganda Wildlife Act, Cap 200 of 2000. The 1995 Constitution of the Republic of Uganda provides for state protection of important natural resources such as land, water, wetlands, minerals, fauna and flora on behalf of the people of Uganda under Objective XIII. It provides for creation and development of parks, reserves, recreation areas and conservation of natural resources by central and or Local Governments under Objective XXVII. The same objective further obliges the state to promote the rational use of natural resources so as to safeguard and protect the biodiversity of Uganda (Republic of Uganda, 1995).

The Uganda Wildlife Policy, 1999

The Uganda Wildlife policy that is currently in the final stages of review mentions problem animal control as the main requirement in the plan to reduce Human-Wildlife Conflicts in Uganda. It further states that the district level lacks the capacity to manage problem animals and vermin. The policy states that the main objective of problem animal control is to control wild animals that pose a threat or cause injury to human life, or which cause damage to property. Among the strategies mentioned is '*the building of farmer's capacity and district authorities to manage problem animals and minimize damage to crops, livestock, property and loss of human life'.*

At the time of drafting this policy it was anticipated that with time, the local government would be empowered to handle problem animals with advice from Uganda Wildlife Authority (UWA). The implementation of the Uganda Wildlife Policy for vermin control by most districts in Uganda has failed due to budget constraints and in most cases the districts failing to priorities vermin control in their budget allocations (Mwesigye Mudanga, Kisoro District Natural Resources Coordinator *pers comm*). Vermin control measures have been implemented in only in a few districts of Uganda such as Masindi where vermin control officers were recruited but after facilitation from a local NGO.

Uganda National Policy on Conservation and Sustainable Development of Wildlife Resource (Draft), 2011

The Uganda Wildlife Policy (1999) is in the final stages of being reviewed, with emphasis on Human-Wildlife Conflict as the main challenge to wildlife conservation in Uganda. It prioritizes the mitigation of human wildlife conflicts in order to enhance a positive attitude towards conservation of wildlife resources in Uganda.

Objective 2.4.4 of this policy is to effectively mitigate human wildlife conflicts. This objective has ten strategies to tackle human wildlife conflicts:

a. Establishing and maintaining barriers along wildlife protected area boundaries for all areas susceptible to stray wild animals;
b. Regularly compiling baseline information on damage by wildlife on crops, livestock, property, injury and loss of life;
c. Establishing a special fund to support human wildlife conflict mitigation interventions;
d. Increasing and directing revenue sharing funds to human wildlife conflict mitigation and other wildlife conservation related interventions;
e. Compensating for loss of human life and injuries caused by wild animals escaping from wildlife protected areas;
f. Creating capacity of Local Governments and communities to address problem-animal and vermin control challenges;
g. Developing and implementing national guidelines for problem animal and vermin control and management;
h. Identifying wildlife species that should be classified as vermin, problem animals and protected species;
i. Promote value addition and utilization initiatives in vermin and problem animal management; and
j. Managing and controlling human-wildlife-livestock disease interface.

The Uganda Wildlife Act Cap 200 of 2000

The Wildlife Act is guided by the Wildlife Policy of 1999. The Act provides for the establishment of UWA as the body responsible for wildlife management in Uganda, both inside and outside the wildlife protected areas. The Wildlife Act also provides for the management of problem wildlife inside and outside the protected areas.

The act addresses the following issues in regards to Human-Wildlife Conflicts in Uganda:

i. It gives the Executive Director of UWA the power to declare an animal a 'vermin' or 'problem animal' and also the authority on how to deal with each of these animals in an ecologically acceptable manner. In Uganda, bush pigs, baboons and vervet monkeys were declared vermin and local communities are allowed to kill them whenever they are outside the park. However, the killing is only done under the supervision of UWA;
ii. The Act also provides for how people should respond when wildlife kills human beings or hurts them and when property is damaged. It specifically states that any harm caused by wildlife should be reported

to an officer. The officer is charged with responsibility on how to deal with the wildlife species in question basing on his assessment of the level of threat posed by the wildlife.

Revenue sharing between the protected areas and adjacent local communities

National parks in Uganda have been sharing the gate entry revenue with the surrounding local communities where the park entrance is located since the year 2000. This arrangement is provided for by the law in the Section 69(4) of the Wildlife Act Cap 200 that states: "*The board shall, subject to section 22(3), pay 20 percent of the park entry fees collected from a wildlife protected area to the local government of the area surrounding the wildlife protected area from which the fees were collected*".

The overall objective of this arrangement is to ensure strong partnership and good relations between protected areas management, local communities and local governments leading to sustainable management of resources in and around protected areas by enabling people living adjacent to protected areas obtain financial benefits derived from the existence of these areas that contribute to improvements in their welfare and help gain their support for protected areas conservation.

The specific objectives include:

i. To provide an enabling environment for establishing good relations between the protected areas and their neighboring local communities;
ii. To demonstrate the economic value of protected areas and conservation in general to communities neighboring protected areas;
iii. To strengthen the support and acceptance for protected areas and conservation activities from communities living adjacent to these areas.

The purposes of the summation of the main and specific objectives are to lessen the effects and solve the problem of human wildlife conflicts around national parks in Uganda. The revenue sharing program was instituted to win the hearts and minds of local people in regards to co-existing with wildlife.

It is important to note that though this money is collected and handed over to the local government by UWA, the latter has little say on what the money is used for as the law (The Local Government Act of 1997) provides that the local government in consultation with the local communities should agree on how the money should be spent. (Republic of Uganda, 1999).

Since the year 2000, a vast chunk of this money has been committed to community good projects like building schools and health centers, constructing feeder roads and rain water tanks and household level projects like supplying improved crop seeds, improved breeds of goats and pigs, and support to modern

beekeeping. However, only a small percentage of these funds have been committed to Human-Wildlife Conflict management. While the above mentioned development projects are very important for the local communities, the support of these projects supported by revenue sharing program have been riddled by corruption leaving most communities unsatisfied and ungrateful (Tumusiime & Vedeld, 2012). This revenue sharing program is only practiced in protected areas managed by UWA and because of its success, the National Forest Authority are trying to establish similar programs in the forest reserves they manage. The programs has got its success but has also been criticized a like by the local communities for its lack of transparency and failure to compensate the local communities who incur loses to problem animals. As such, the revenue sharing programme in UWA has been reviewed so that priority is given to projects that address Human-Wildlife Conflict and human welfare.

Majority of the protected area managers indicated that availing all or most of the revenue sharing money to supporting Human-Wildlife Conflict interventions would not only help in reducing the problem facing protected areas that generate the money, but would also combat the wide spread corruption involved in managing the funds. It is envisaged that in this way, a more critical aspect of poverty and livelihoods that affect most front line communities that incur the costs of living on the border with protected areas would be tackled. From the reviewed draft of the UWA revenue sharing program the guidelines indicate that "*revenue sharing projects prioritization will be based on the extent to which the identified projects address Human-Wildlife Conflict as well as human welfare in an efficient and cost effective manner*" (UWA, 2011). One aspect that the new draft revenue sharing guidelines do not address is that of increasing the allocated 20% gate collections. Local communities have complained that this percentage is too low for the local communities to realize any tangible benefits. For example, in Bwindi, Uganda, the park, on average, allocates about 3 million Ugandan shillings (US$1,128) for each parish per year for local community projects.

Gorilla levy fund

The gorilla levy fund like revenue sharing fund is meant to give back to those communities that bear the costs of living next to protected areas and create good relationship and partnership with protected area management (UWA, 2011). According to the draft revised revenue sharing guidelines (UWA, 2011), the gorilla levy is referred to as part of the voluntary contributions. The gorilla levy fund was established in 2006 for Bwindi and Mgahinga for which a US$5 is collected from every gorilla permit. The collected funds are used to support the park adjacent communities.

The first disbursement of the fund had local government officials and UWA take lead in sensitizing communities about the guidelines for utilization of the

gorilla levy and communities were able to participate in project identification and selection. Some of the identified projects were: livestock rearing (primarily pigs and goats), cultivation of potatoes, support to community-based volunteer groups to deter wild animals from damaging gardens and interventions to control Human-Wildlife Conflict.

Some of the interventions related to Human-Wildlife Conflict included repair work on a stone wall constructed to prevent buffaloes from raiding gardens adjacent to Mgahinga and maintenance of the live fence (Mauritius thorn hedge) around Bwindi. In Mgahinga, the frontline communities with guidance of UWA agreed to use most their money to support Human-Wildlife Conflict interventions (Charles Okuta, Community Conservation Warden, MGNP, Uganda, *pers comm*).

Neither the wildlife policy nor law in Uganda addresses an important issue of compensation when wildlife damages local people crops or harms/ kills a member of the local community. Yet, failure to compensate for crops damaged or injuries by animals foraging out of the park remains the greatest issue of discontentment communities' voice towards the protected areas (Archabald & Naughton-Treves 2001; Lauditi 2010).

2.2 RWANDA

Compensation law

To reduce Human-Wildlife Conflicts, an amendment to the wildlife laws has been made to include compensation for damages caused by wildlife. The laws are now in force (Law No. 26/2011 of 27/07/2011 on compensation for damages caused by animals; Law No. 52/2011 of 14/12/2011 establishing the Special Guarantee Fund for automobile and damages caused by animals; Prime Ministers Order No. 26/03 of 23/05/2012 determining the rates, calculating method and criteria for determining compensation to the victim of damage caused by an animal; and Ministerial Order No. 14/MINICOM/2012 of 18/04/2012 determining the list of wild animal species concerned with the law on compensation for damages caused by animals) and compensation claims are now being processed for wildlife damages around Volcanoes National Park. The laws cater for compensation to family members of the person killed by animals, to the victim of corporal injury caused by an animal, and for loss or damage of property. Money for compensation is provided by Rwanda Development Board (BRD) by allocating five percent of the annual revenues from tourism through the newly established Special Guarantee Fund (SGF) in line with the government's wildlife damage refund scheme. A criterion for calculating the compensation has been set and as well as the wild animals whose damage is liable to compensation. The compensation laws are meant to complement the preventive interventions like the stone wall and trench. It is too early to determine what impact the law is

likely to have. However, the anticipated challenges are (RDB/GVTC 2011): expense of valuation damage (and complication), who valuates, what costs are involved, accessibility to areas where damage has taken place, total cost of damage may be much higher than park revenues unless compensation for damages is limited, red tape, long legal process and corruption unless clear guidelines are laid out.

Revenue-sharing

Five percent of the annual tourism revenues from all the protected areas are put into a fund for community projects in administrative sectors that neighbor national parks. The RDB issues calls for proposals, and a project selection process is made at sector and district levels. Sectors are the second major administrative entities which will be autonomous when the decentralization process is complete, and are being coordinated by the districts. Selection criteria include positive impacts on conservation of biodiversity in protected areas, and to local community. Areas that register more cases of conflict between protected areas and the community, according to results of Ranger-Based Monitoring (a system used by RDB to monitor biodiversity) have preferential access to funds, as do those which are located closer to protected areas. Sustainability of the project (gauged through economical, social, and environmental indicators stated in the proposal, and their likelihood to be achieved) and the proportion of community contribution are also considered. Once the projects are selected, contracts are signed with the district authority and the community. The contracts' validity is set for a period that varies according to the project complexity, and can vary from one month to 15 months. The community is often grouped into cooperatives or direct specific target groups, if their ownership and level of organization guarantee effective implementation of the project. The funds have been used for environmental protection projects (tree planting, soil erosion control, and fencing in protected areas to limit access by poachers), conservation education, health care, water and sanitation, basic infrastructures, food security, to other income generation activities. The rationale behind revenue sharing scheme is to "compensate" those who incur the costs of living near a protected area. Currently the revenue sharing funds in Rwanda are being used to support more infrastructure projects than small income generating projects. For example in 2012-2013 revenue sharing contribution ratios of infrastructure to small income generating projects was 66 percent: 34 percent respectively. However, park management is advocating for more support to small income generating projects for communities neighboring protected areas especially cooperatives involved in community conservation and park management like the crop ranger associations (Uwingeli, 2012).

2.3 DR CONGO

The law dealing in wildlife resources (No. 082-002 of 28 May 1982) regulates hunting of certain species under total protection status. Together with this law, there is also ordinance-law No. 69-041 of 22 August 1969 on the conservation of nature, which sets out a framework for improved conservation of wildlife in general, especially the great apes, which are covered under the notion of "nature reserves", and law No.75- 024 of 22 July 1975, concerning the establishment of "sanctuary areas"

In regulatory terms, arrangements for species protection derive from the combination of certain provisions of the hunting regulations under law No. 082-002. For example, article 26 states that:
For hunting purposes animals are divided into three categories:

i) *Fully protected animals*
ii) *Partially protected animals*
iii) *Non-protected animals*

On these grounds, Article 27 states that "it is forbidden to kill, capture, hunt, pursue, deliberately disturb, or illegally and with prejudicial intent cause any of these animals to flee, unless furnished with a scientific permit issued by the ministry responsible for hunting issues". There are no sectoral policies in the DRC and tropical forests and biodiversity are managed through legislation only.

It should be noted that the legislation in DRC does not provide for how problem animal should be dealt with. It however mentions that communities are not allowed to kill animals' crop raiding under the hunting law.

The draft nature conservation law introduces major reforms to law No. 69-041 of 22 August 1969 in that it: "*Is based on the principle of the establishment of a system of parks for which special measures must be taken to conserve biological diversity, the protection of ecosystems and natural habitats and maintain viable populations of species in their natural environment*". In reality, this would necessitate addressing Human Wildlife Conflict in an acceptable manner for conservation and local community livelihood (Seyler *et al.* 2010).

There are no specific provisions in the current laws dealing explicitly with Human-Wildlife Conflict. However, in early 2012, a ministerial directive was made to ICCN to start looking into the modalities for compensation due to wildlife damages to property and injuries or deaths of persons (Nobert Musanyi, Deputy Director, PNVi/ICCN *pers comm.*).

3. HUMAN-WILDLIFE CONFLICT SITUATION IN GVL

In spite of all the protected areas lying in the same region, the Human-Wildlife Conflict situation varies among the three countries and the eight protected areas (Kalpers *et al.* 2010). The interaction between wildlife and people is correlated to factors like the ecology of the protected areas - vegetation/habitat type, topography, animal composition, distribution and population density, and human related issues like land use, social-economic/cultural conditions, population distribution and density on areas that border the protected areas. We, therefore, made a situational analysis of Human-Wildlife Conflict specific to each protected area based on information available in the last decade or so.

3.1 Queen Elizabeth Protected Area, Uganda

QEPA experiences Human-Wildlife Conflicts in all the seven districts that border it - Kanungu, Kamwenge, Ibanda, Rubirizi, Kasese, Mitoma and Rukungiri. The most problematic animal, in terms of the frequency of crop raiding events and level of damage is the elephant. Elephants destroy crops (cotton, maize, millet, rice, and banana plantations). In some areas, buffaloes are also a problem. Other problem animals include crocodiles, lions, leopards, which, occasionally, cause death and injury to people, and baboon crop raids are localised.

3.2 Bwindi Impenetrable National Park, Uganda

In Bwindi, the Human-Wildlife Conflicts vary with location. Elephants are a problem in the south (Rushaga) during the dry season and southeast (Ruhija and Kashasha) during the wet season; baboons are a great problem, almost raiding crops on a daily basis, around the North Sector and southwest (Buhoma), they are frequent in southwest (Ruhija, Kiyebe, and Nyakaranga) but rare in the east (Rwamunyonyi). Bush pigs are rare around the forest except in the south (Nteko) where there are still patches of natural forest at the edge of the park, and monkeys around the south sector of the park. The most destructive are the elephants, followed by baboons, mountain gorillas, monkeys and bush pigs in that order. A few cases of mountain gorillas causing bodily injury to people are occasionally reported.

3.3 Mgahinga Gorilla National Park, Uganda

The most problematic animal around this park is the buffalo. Other crop raiders are the porcupines, bush bucks, duickers and elephants. In the eastern side of the park (Gitenderi parish), porcupines and birds are perceived to be the major problem animals, with porcupines regarded as the worst crop raider. Irish potato loss to porcupines is raised as a major source of conflict because of the fact that it is the main source of cash income to the local community in the area

(Andama, 2000). Crop loss to porcupines was estimated to be about 40% with Irish potatoes being the most affected (Andama, 2000). Root rats (*Tachoryctes ankoliae*) are considered to cause more damage than porcupines (CARE, 2003). Bird raiding is rampant mostly on wheat, maize, millet, and sorghum. In Gisozi parish, the buffalo is the main crop raider, penetrating 2-3 km into the villages, raiding at all seasons of the year on Irish potatoes, beans, maize, millet, and sorghum.

3.4 Rwenzori Mountains National Park, Uganda

The most problematic wild animal species around RMNP are; monkeys (Blue monkey/ Vervet monkey, bush pigs, chimpanzees, rats, porcupines, squirrels and birds. Monkeys, bush pigs and chimpanzees are major causes of Human-Wildlife Conflict. Segregation of problem animal species based on site: bush pigs (51%) and monkeys (29%) as the major wild animal species raiding crops in Kasese. In Kabarole district bush pigs and chimpanzees were major raiders in addition to rats, porcupines and squirrels. In Bundibugyo, monkeys are considered to be the major raiders followed by bush pigs while chimpanzees also come out only occasionally (Ripples Consult, 2012).

3.5 Semuliki National Park, Uganda

In Semuliki, baboons and buffaloes are the major crop raiding animals, though elephants and bush pigs also cause problems intermittently. Buffaloes cause most damage but their damages are localized, while baboon raids are more frequent and evenly spread over park edge gardens. The buffaloes normally raid at night, making their control difficult.

3.6 Virunga National Park, DR Congo

Buffaloes and elephants are the biggest problem around PNVi though gorillas also stray out of the park. Insecurity and low human population density around the park has led to less land being occupied, coupled with disturbance of wildlife within the park like poaching, charcoal burning, fuelwood collection lead to crop damage being recorded several kilometers from the park boundary and damage being spread over extensive areas (Kalpers, *et al.*, 2010). Most crop raiding has been reported along the Mikeno sector boundary, buffaloes are often reported in Jomba and Bukima areas. Elephants are reported around Jomba, Bukima and Bikenge. Elephants have also been reported raiding in the southern Ishasha area of PNVi and also go further in Uganda to raid around QEPA. Historically, the Rugendo gorillas have been the only group to exit the park, but currently other groups like Humba and Mapuwa and lone silverbacks are reported to come out frequently. The gorillas come out and feed on maize and bananas.

3.7 Volcanoes National Park, Rwanda

The most frequent crop raiders are buffaloes and habituated groups of non-human primates – the mountain gorillas and golden monkeys in that order. Other animal raiders include porcupines, antelopes and occasionally, elephants. Previously, it is the buffaloes, elephants, porcupines and antelopes that were a problem. Non-human primates started becoming a problem about five ago, when they begun staying in community fields more often and spending more time on land out of the park, debarking eucalyptus trees and destroying crops. The reason for this sudden change in the behavior of mainly habituated non-human primates is still not well known but is hypothesized to be either the habituated groups escaping confrontation with the growing number of gorilla groups, as a result of expanded foraging patterns and the readily available food source of community gardens, or due to a loss of fear of humans.

4. HUMAN-WILDLIFE CONFLICT MITIGATION MEASURES

A variety of strategies are in use around the protected areas in GVL in an attempt to physically deter wildlife from crossing over to cultivated fields and/or by increasing public tolerance for wildlife. The interventions vary from protected area to protected area depending on animal species, farming systems and strategies, measures that have been tested and accepted by local communities, and biophysical features of the area/site.

4.1 Deterrence of Wildlife

These are direct interventions that reduce the severity or frequency of encounters between wildlife and people or their property.

4.1.1 Trenches

A trench, normally 2m wide and 1.5 - 2m deep is excavated at the park edge (Figure 2). It is a deterrent to non-jumping animals such as elephants, buffaloes and bush pigs. The soil excavated from the trench is heaped on top of one side of the bank, making the trench to appear deeper.

Figure 2. A trench on the boundary of Queen Elizabeth Protected Area, Uganda

Sometimes, trees are planted on the community side of the trench to stabilize the bank. The deterrent has been applied in relatively flat areas of Kibale, and

QEPA in Uganda and also along the contour in Volcanoes, Rwanda. Trenches limit locations where problem animals are likely to cross (Mackenzie & Ahabyona 2012). However, trenches require regular maintenance to avoid silting and damming. Also, raiding animals learn how to destroy them or move around them (Osborn & Parker 2003; Thouless & Sakwa 1995). For example, in QEPA, Uganda, elephants destroy the banks of the trench on spots where the soils are soft to gain access to cultivated fields (Figure 3)

Figure 3. A spot in QEPA where elephants destroyed a bank of a trench to cross from the park to a cultivated field

4.1.2 Stone/Buffalo Wall

Stones are heaped at the park edge to form a wall, usually 2m wide and 1 – 1.5m high (Figure 4). The deterrent is common in the Virunga because the stones are abundant and near the park boundary and local people voluntarily supply the stones to get rid of them from their cultivated farms, and the local availability of workmanship. It is a

Figure 4. A stonewall in Mgahinga Gorilla National Park, Uganda

deterrent to non-jumping animals like buffaloes, duikers and porcupines. But the raiding animals can learn how to destroy them or move around them (Osborn & Parker 2003; Thouless & Sakwa 1995) (Figure 5). This intervention is common around the protected areas of the Virunga Masiff – Volcanoes (Rwanda), Virunga (DR Congo) and Mgahinga (Uganda).

Figure 5. A spot in MGNP, Uganda, where buffaloes pushed over a section of the stone wall to cross from the park to a cultivated field

4.1.3 Live fencing with Mauritius thorn

Mauritius thorn (*Ceasalpanea decapitata*) hedge is used as a "live fence" to deter baboons, bush pigs, gorillas, bush pigs and elephants (Figure 6). It has been planted in Kibale, Rwenzori, and Bwindi. Pre-soaked Mauritius thorn seeds are directly seeded at intervals of 50cm in three rows, 30cm apart. The resultant hedge is effective when established at these distances and when the branches are layered and intertwined by hand to form an animal-proof barrier.

Figure 6. A well managed Mauritius thorn hedge at the boundary of Bwindi Impenetrable National Park, Uganda

The literature indicates that constructing fences is futile without support of local communities to assist fence maintenance.

4.1.4 Red Pepper Chilli

This package is of low-tech and is a sustainable defence based around the olfactory deterrent of chilli and produces good results in smallholder agricultural situations (Sitati & Walpole 2006; AfESG 2010). Ripe chilli is chopped or pounded and mixed with water, cow or elephant dung to form a block and left to dry. The dry blocks are burnt along established elephant paths and produce a noxious smell that repels elephants. Also, the pounded chilli is dissolved in discarded engine oil and solution soaked in old rugs, which are intermittently tied across the rope and the rope strung on two poles at about

1.5m height across the known elephant paths (Figure 7). The rugs are then set on fire. The smoldering rugs produce a noxious smell that chases away elephants. Elephant damage is known to be localized as they persistently damage crops at same sites, making it easy to spot their paths in the protected areas. The problem is when it rains, it washes away the chilli solution and extinguishes the fire. Also, the chilli smell is wind-dependent and thus directional control is difficult.

Figure 7. Rugs soaked in a solution of Chilli and discarded engine oil hanging on string across an elephant path, Kibale National Park, Uganda

This means that if the wind is blowing away from the elephant routes, it may be ineffective. However, even if the chilli odour is not inhaled, elephants are aware of the substance and this helps maintain the elephants' association of the material with chilli smell (Hoarse 2012). This technique has been tested and implemented in Kibale and Bwindi, Uganda.

4.1.5 Bee Hives

Research is not conclusive about the efficacy of bee hives as a deterrent to crop raiding elephants (Hoarse 2012). Therefore, the use of bees for general crop protection is still in doubt. However, field trials seem to have concentrated on 'anti-bee conditioning' of elephants to presence of bee hives that were without bees (King *et al.* 2009). However, field trials with occupied bee hives have reported great success in deterring elephants from crossing to gardens (King *et al.* 2011). Athough individual bees are less active at night and/or during the cold days, the time/weather the elephants are likely to crop-raid, there is a constant buzzing sound of bees fanning their wings from fully occupied hives, which may give elephants enough warning to stay away (King *et al.* 2007). In the GVL, colonised bee hives are placed about three to four metres from ground level in form of a fence in such way that elephants contacting the barrier would disturb the insects in the hives (Figure 8). This deterrent is now practiced in QEPA and the local communities regard it as a huge success.

Figure 8. Colonized bee hives placed along the boundary of Kibale National Park, Uganda

4.1.6 Scare Shooting

This is done by park staff mainly to scare off elephants, buffaloes and baboons from community fields or from the edge of park. Rangers' fire rifles a couple of times. This has been done for a long time in all the protected areas in GVL since they were gazetted. However, some raider species like elephants are no longer fearful of gunshots, therefore the method sometimes does not drive the animals back into the protected area.

4.1.7 Human Guarding

This is done by local communities or hired labour to guard against vermin and problem animals destroying crops. Shelters are constructed and fire made to burn at the entrance (Figure 9). It usually involves shouting, banging objects, throwing sticks or stones to scare the animals. Shelters are used at night and/or when it is raining. This method is effective against nocturnal animals like buffaloes, elephants and bush pigs and diurnal animals like the primates. Animals will flee or avoid intensely guarded fields and men are more effective guarding against primates than women or children (Naughton-Trevis, 2001). Therefore, guarding is labor intensive, often restricting the household from participating in income-generating activities (Hill 2000; Naughton- Trevis, 1998; Osborn & Parker, 2003), or keeping children from school to guard crops

Figure 9. A shelter used by people while guarding fields against elephants in Queen Elizabeth Protected Area

(Haule et al., 2002; Kagoro-Rugunda, 2004) and increased risk of disease like malaria (Mackenzie & Ainebyona 2010) and body injury. This practice of scaring and chasing wild animals predates the gazettement of the protected areas.

4.1.8 Chasing/Herding

Community volunteers (Figure 10) participate in problem animal control through scaring and gentle chasing i.e., drumming and sounding tins to deter gorillas, elephants and baboons from raiding crops and attacking livestock and people. Community-based

Figure 10. HuGo members, Bwindi Impenetrable National Park, Uganda

associations have been formed (Human Gorilla [HUGO] Conflict Resolution in Bwindi, Uganda and Virunga, DR Congo and Crop Rangers in Volcanoes, Rwanda). In the case of gorillas coming into cultivated or residential areas, these volunteers from local communities have to chase the gorillas under the supervision of a park ranger. Tactics need to be varied over time if a group becomes desensitized to a particular deterrent, but not all gorillas habituate to chasing methods (Macfie 2000).

4.1.9 Traps

These are constructed using poles, ropes and grass (an enclosure) (Figure 11) on community land, this has been effective in trapping baboons. As a precaution against capturing non-target species, the traps are not used where there is potential of capturing a gorilla or a chimpanzee. The deterrent has been used in

Figure 11. A trap used for capturing raiding baboons around Bwindi Impenetrable National Park, Uganda

Bwindi but is generally considered ineffective (Sitati *et al*. 2005; Weber *et al*. 2007)

4.1.10 Buffer Zone

With support from IGCP, UWA acquired land (12kmx350m) along the southern park boundary of Bwindi (Figure 10), Uganda, at a cost of US$400,000 to serve as a buffer. This was as a result of the Nkuringo

Figure 12. Buffer land to the south of Bwindi Impenetrable National Park, Uganda. Source: IGCP (2010)

gorilla group spending about 60% of their time on community land following habituation. This had posed a risk to the health of the mountain gorillas but also had increased Human-Wildlife Conflicts from crop raiding and physical attack on people by gorillas.

4.1.11 Buffer Crops

Farmers reduce crop loss by planting less palatable crops or pasture near the protected area boundary. Crops like tea (Figure 13) are not damaged by any animal and only a small fraction of bananas is destroyed since they are planted on large tracts of land so that no banana field is entirely consumed, not even by elephants (Naughton-Trevis, 2001). To be successful as a buffer, the cultivar must be profitable, unpalatable, and planted over a large enough area to reduce attractiveness of crops beyond. A tea buffer is unlikely to deter elephants unless it is planted continuously and extensively. Given the small landholdings on

the edge of most protected areas in GVL, a buffer is a viable option only if neighbors collaborate in their planting. Affluent farmers increase the size of

Figure 13. Tea fields adjacent Bwindi Impenetrable National Park, Uganda

their farms by buying more land by the protected area edge. This may reduce the risk as large farms are less likely to lose an entire season's production due to a single incursion by wildlife. Local perception of crop loss often reflects extreme events, where an entire field or season's production is destroyed in a single raid, rather than average losses.

4.1.12 Electric Fence

The Virunga National Park has an electric fence covering a distance of 15km. It covers most of the north part of Mikeno sector. ICCN hopes to cover the remaining part of Mikeno sector when the security situation stabilizes. The fence is powered by solar energy and has been put up using local labor from the communities affected by problem wildlife. In Rwanda, the Akagera National Park has also been fenced by an electric fence (Figure 14) powered by solar that runs a distance of about 57km. When completed, it will cover 120km at cost of US$ 2,764,436.

Figure 14. An electric fence around the Akagera National Park, Rwanda. Source: RDB, Rwanda

According to both ICCN and RDB, electric fences have been quite effective in controlling problem animals, especially habitual elephant raiders. However, they are a few cases where big mammals like the primates, elephants and antelopes

have devised ways of overcoming the electrified fence barrier. For this reason, it is important to have other interventions to complement the electric fences.

4.1.13 Chain link

This has been erected on the eastern side of QEPA, Uganda (Figure 15). It is a personal initiative of one rich farmer to prevent elephants from raiding his mixed animal/crop farm. It is expensive to make such a fence around the park but could be used on sites where other interventions are not feasible like where a river crosses the park boundary.

Figure 15. A chain link fence on the edge of Queen Elizabeth National Park, Uganda. Source: Benon Mugerwa, CCW, QEPA

4.2 Raising Public Tolerance for Wildlife

These are indirect interventions that raise public tolerance of wildlife damages or threats.

4.2.1 Compensation Scheme

Calls for compensation programs due to large crop losses by animal raiders at the boundary of protected areas have been made for a quite some time (Lauditi, 2010; Naughton-Treves, 1998; Tchamba, 1996). At the time of writing this report, compensation claims from around VNP had been submitted to the RDB and were still being verified. Monetary compensation schemes for crop damage have been attempted on several occasions in eastern and southern Africa. Such schemes were nearly always abandoned after it was shown that they are open to abuse or blatant corruption, were cumbersome and expensive to administer, and reduced motives for self-defense among farmers (Jones-Bowen 2012). It is still too early to judge the successes and challenges of the scheme in Rwanda. But suffice to say that success or failure of this scheme is likely to have important ramifications on how the compensation scheme is viewed by protected area authorities and governments in neighboring countries.

4.2.2 Revenue Sharing and jobs

Tourism revenues are shared between the protected areas and local communities bordering the protected. This is meant to offset the costs,

including Human-Wildlife Conflict, incurred by people for living near the protected areas. Revenue sharing mechanisms differ amongst the three countries. According to the GVTC Midterm Review Report (2010), in Uganda the system is based on 20% share of park entry fees. In DRC the distribution is such that 50% goes to ICCN in Kinshasa, 20% to operational costs of the park and 30% to development of community projects for people adjacent to the park. In Rwanda, revenue sharing is based on 5% of the gross revenue from the all the parks which is shared between the three national parks; 40% to PNV, 30% to each of the other two parks; Nyungwe and Akagera National Parks. The funds are used for Community good projects like infrastructure development, household projects like modern bee keeping, piggery and keeping goats, or of recent, establishment of Human-Wildlife Conflict reduction or prevention measures.

4.2.3 Local Resource Use

Local communities are allowed limited access to protected resources. Materials such as grass, basketry fibre, and medicinal plants can be removed from the park by the local communities under agreement with parks. The local people in turn are supposed to support conservation efforts like reporting illegal activities and helping in extinguishing wild fires. Such schemes have been found to change significantly the attitudes of the poorest of the poor towards the protected areas (Blomeley *et al.* 2010).

4.2.4 Community Outreach and Communication

This is a cross-cutting intervention that is done to complement each and every Human-Wildlife Conflict intervention. Local people are often sensitized about animal behavior and their conservation value, are involved in selecting, designing, implementing and maintaining a desired problem animal control intervention. Interventions that have been implemented without local community participation, have, more often than not, failed.

5. COST-EFFECTIVENESS OF THE INTERVENTIONS

Large amounts of money have been invested in Human-Wildlife Conflict resolution. However, it was extremely difficult to trace the costs incurred when the Human-Wildlife Conflict interventions were first set up. The funds were from several different organizations and the financing was spread over a period of time, spanning close to a decade. Furthermore, there are no accurate records of the frequencies of raiding events or amount of damage by raiders, before and after the establishment of the Human-Wildlife Conflict interventions. It was therefore not possible to make an empirical economic analysis of the interventions. If we had the costs of setting up and maintaining each

intervention and the frequency of raiding events and amount of raiding damage, we would have made an economic analysis using the cost-effectiveness approach. Deterrent measures are most appropriate when effectiveness is more important than cost, and when the Human-Wildlife Conflict is expected to persist for the foreseeable future (Muruthi 2005). The cost effectiveness would be determined by comparing the costs of each alternative with their expected non-monetary benefits (World Bank, 1996) in terms of reduction in the frequency of raiding events and amount of damage. This would enable us to compare the overall effectiveness of Human-Wildlife Conflict interventions and compare the various interventions with the baseline costs of no action. Nonetheless, we determined the efficacy of the interventions based on peoples' perceptions and from literature. However, the literature is based on limited data, collected for relatively short time, from a few sites, where different sampling regimes were used.

5.1 Buffer land

Musaasizi (2006) argues that the purchase of buffer land in Nkuringo, Bwindi, Uganda, is considered an expensive experiment that will pay off despite the challenges it now faces. The community members and local leaders in Nkuringo are satisfied that the purchase was a very good bargain and are keen to participate in the management of the buffer zone. In terms of addressing the level of conflict and fear of gorillas experienced by communities prior to 1998, the investment in the GMRTs and the land purchase has successfully diffused a very difficult situation. It is recognized by all the stakeholders parties that there are few alternatives and the cost effectiveness of these is very low. The introduction of tea as an alternative crop/activity in the buffer zone could increase its effectiveness because a tea factory is to be built nearby and also tea is not raided by animals. There is potential to reduce crop raids and also create an extra income for the local people.

5.2 Trenches

Trench excavation is financially justified but only in areas with high frequency of animal raids and large losses to the larger and more destructive mammals such as elephants (Mackenzie & Ahabyona 2012). The costs of excavating and maintaining the trench are extremely high, but once the trenches are established and maintained, crop raiding events are restricted to a few spots and number of farms raided is significantly reduced, thereby reducing the costs of guarding and crop loss. This justifies the costs of excavating a trench. This intervention is, however, not recommended for protected areas where there is a low frequency of animal raids and/or the raiding animals are a small population, however destructive;

5.3 Human guarding

Human guarding is the least cost-effective technique. First, only a few spots can be guarded, out of the entire length of the protected areas. Second, guarding is labor intensive, involving individual members of the households making all-night (and occasionally all-day) vigils, guarding increases as the risk of raiding rise, especially towards harvest time (Mackenzie & Ahabyona, 2012) but are only partially effective (Naughton-Trevis, 1998). Also, there are the social costs of guarding, such as the children involved having poor scholastic achievement, the high risk of contracting diseases like mosquito transmitted malaria or being injured or killed by raiding animals, and loss of opportunities to engage in income generating activities (Naughton-Trevis 2001; Mackenzie & Ainebyona, 2012). Guarding also introduces health risks to people and animals (Hockings & Humble 2009). In addition, policies restrict farmers from chasing or scaring the endangered mountain gorillas even when they stray onto their land or destroy their crops and prohibit farmers accessing areas where gorillas are even if it is their land (Laudati, 2010). Because of these factors, the costs of this strategy are prohibitively high. Surprisingly, most local people believe that guarding is the most effective intervention in most protected areas around GVL when compared to other interventions. This is because the local people are already familiar with the technique and is therefore locally acceptable (Akampulira, 2011), and/or there is lack feasible alternatives, guarding being the only option the local farmers can afford or access (Hill *et al*. 2002).

5.4 Live fence

The Mauritius thorn hedge is one of the most cost effective interventions around the GVL for primates like the baboon and mountain gorillas and bushpigs (Andama, 2009). It requires a reasonable amount of investment especially at the beginning mostly in terms of seeds, equipment, community mobilization and education. Most communities in the GVL who have taken up the hedge intervention find it effective, though they seem to think its management is time consuming, and not as effective as guarding, though guarding during the day takes up more of people's time when the two are compared. Mauritius thorn is also feared to be a highly invasive species that spreads rapidly, if not managed properly, prevents the regeneration of natural species and farmlands (Plumptre *et al*. 2007). In the northern part of Bwindi, the hedge has been reported to have reduced the number of absenteeism in school (Masiga *et al* 2011);

5.5 Stone wall

Stone wall construction around the GVL is economically justified as it has been quite effective in reducing buffalo raids around the Virunga. The costs of installation and maintenance are not high because the construction materials

and the technical knowhow to construct the wall are available locally. The costs which are being incurred by the local farmers without the wall are high including abandoned cultivating some fields adjacent the protected area boundary because of losses of whole harvests. It should however be noted that elephants and primates cannot be prevented from getting out of the protected areas by the wall.

5.6 Community-based associations

For controlling problem animals, the community based organisations (ANICO, Crop rangers, HUGO) are the most recommended interventions around the GVL because of the their volunteering nature. The associations have been quite effective against mountain gorillas in BINP and PNVi and elephants in BINP, although the response times are often slow (12 to 48 hr) and consequently crop damage is extensive (Musaasizi 2006). In addition, HUGO in BINP is used to mobilize communities for other interventions and in PNVi they participate in park patrols and removal of snares. The costs involved are majorly incentives (Equipment, food and clothing) meant to encourage the HUGO members and facilitate their work (Kalpers *et al*, 2010). More sustainable incentives for HUGO groups are needed to encourage more voluntarism and make the program self reliant such as the savings scheme that is in place for HUGO members around Bwindi, Uganda. This can act as partial compensation for the team members for the time spent guarding and chasing gorillas and chasing gorillas from cultivated fields (Musaasizi 2006). All in all, it can be said that community-based associations are a cost effective intervention if the volunteering spirit can be sustained;

5.7 Bee keeping

It is one of those few interventions that reduces elephant crop raiding and at the same time an alternative livelihood activity for the local people. The intervention is highly advantageous in that bee keeping is a low technology intervention, readily affordable by smallholder farmers, is culturally practised among the local farmers, therefore can be easily adopted. The initial investment used in the establishment of the apiary can be recovered during the second honey harvest (Norah Mbubi, Community Conservation Ranger, Kibale, Uganda, *pers comm.*). When bee hive fences complement the trenches, the combination is quite effective against elephants. Bee keeping as an intervention has the great potential of being self sustaining. The beehives need to be colonized to prevent elephants being habituated to the barrier (King *et al*. 2011);

5.8 Red chilli

Like bee keeping, this intervention provides an income to local farmers from red chilli sales in addition to reducing animal raids. Communities, like those in Kibale,

Uganda, that use it for the two purposes have benefited a lot , while communities in BINP who use it only for deterring raiding animals are yet to enjoy the economic benefits of selling red chilli. For this reason, around Kibale, Uganda, it has been widely adopted compared to BINP where farmers are still depending on UWA to provide the red chilli. The costs of starting up a red chili project can be recovered subsequently from the sale of fresh chilli. Like bee keeping, Red chilli can be sustainable, both as a Human-Wildlife Conflict reduction intervention as well as a livelihood activity;

5.9 Buffer crop

These are only cost effective against crop raiders if planted on a large enough area to reduce the attractiveness of crops beyond (Naughton-Trevis, 2001). Given the small landholdings of majority of the local farmers around the protected areas in the GVL, buffer crop is only viable if neighbors cooperate so that the crop is continuous and extensive. Selection of buffer crop is also not simple. Tea is the best buffer thus far but still cannot be managed by local farmers because of small landholdings. In Kibale, Uganda, soybeans were tried as a buffer crop. Naughton-Trevis (2001) reports that first season in which they were planted, there was minimal damage. However, by third season, bushpigs raided a substantial portion of the crop. In Bwindi, barley was tried in the buffer zone. The first harvest was good, but the second yield was devastated by birds.

5.10 Electric fences

The fences are powered by solar panels thus reducing on the running costs. However, the cost of materials, installation, and maintenance, as well as the theft of materials, make fencing often unaffordable, impractical and unsustainable for large-scale application. When the cleared soil beneath and around the fence is dry, conductivity is reduced. Therefore at the peak of a severe dry season, such a system may require regular wetting of the soil to remain effective. The fences are vulnerable to tree falls and large animals struggling to get free if stuck in fence material. The effectiveness of the electric fences against animals like the primates is low. The intervention should only be applied in situations where large bodied animal raids are very frequent and severe, sites with large/many fields under cultivation and where other interventions are not feasible. Community buy in is crucial to reduce on the maintenance costs.

5.11 Compensation schemes

Few data exist on Human-Wildlife Conflict compensation schemes. Examination of the human-elephant conflict compensation schemes undertaken by African Elephant Specialist Group (Hoare 2001; Muruthi 2005) show that the scheme

can provide a short-term alleviation of the conflict as it addresses the symptoms rather than the causes of the problem. Compensation schemes suffer from degrees or combinations of the following:

- Inability to decrease the level of the problem, as the problem is not addressed;
- Less incentive for self-defense by the farmers, which may exacerbate the problem;
- Require reliable and mobile personnel and logistics to verify and objectively quantify damage over large areas;
- Expensive and slow to administer due to red tape, bureaucracy and stringent financial controls;
- Potential for abuse or corruption through false or inflated claims;
- Absence of sufficient funds to cover all claims;
- The scheme potentially having no end point;
- Unequal payment to victims, causing social problems and disputes; and
- Inability to compensate for unquantifiable opportunity costs for those people who are affected by the threat of problem animals.

However, this does not imply that compensation should not be undertaken. Basing on human-elephant conflicts, Hoare (2001) suggests that since it is only a few people in the community that are seriously affected, it is possible to identify these people and make fair assessments of their situation.

Traditional coping strategies for Human-Wildlife Conflicts like balancing crop losses to wildlife with bush meat gains by trapping or hunting animals in and around their fields or clearing wildlife habitats collapsed when wildlife was declared a property of government and traditional hunting prohibited. Wildlife was herded into protected areas thus creating enclaves with high population densities of animals in a matrix of densely settled agriculture, making the local farmers vulnerable to crop losses due to wildlife. The level of vulnerability to raiding is linked to habitat, human settlement patterns, cultural and agricultural practices, patterns of landholdings, raiding wildlife species, and level of disturbance within the protected area (Naughton-Trevis, 1998, 2001). These factors vary considerably among the seven protected areas. This variation makes universal management prescriptions difficult and also hinders efforts to compare the magnitude of the problem at different protected areas (Naughton-Trevis, 2001). This means that each protected area has to devise means that fits the prevailing physical and sociopolitical conditions in and around it to address Human-Wildlife Conflicts. A list of interventions being implemented for each protected area is shown in Annex 3. The list also shows a detailed assessment of strengths, challenges and approximate costs and source of funds

for establishing and maintaining the intervention in each protected area in the GVL.

6. LOCAL COMMUNITY PERCEPTIONS AND ATTITUDES TOWARDS THE INTERVENTIONS

A broad assessment on how local people view the diversity of human-wildlife interventions in the Ugandan part of GVL was made by Akampulira (2011) and Sheil and Akampulira (2012). They found out that traditional crop guarding remains the most trusted approach on reducing the frequency of animal raids. This is in spite of the social costs associated with guarding such as lost time that would have been spent on some other livelihood project, children missing school and risk of injury by wildlife. Viewed from a local perspective, most interventions had failed or suffered major shortcomings. Interventions were judged more effective only when communities had been involved in choosing, implementing and controlling them.

Because the majority of the Human-Wildlife Conflict interventions were initially introduced with little or no consultation with the local communities, the communities were disappointed for diverse reasons, as follows:

- Technical problems and relatively obvious reasons such as the live fence not growing on rocky ground or across a stream;
- Insufficient attention to sustainability like inputs (e.g. seeds, hoes, pangas, shovels, axes) being available beyond project schedules;
- Benefits being too disappointing, too slow to arrive or too demanding to sustain community support;
- Local concerns being too diverse to sustain shared interventions. For example, landowners using their land to grow trees or other relatively unaffected crops are often unwilling to support interventions to help protect the food crops grown by others along a shared park boundary. Tenant farmers may be unwilling to invest in interventions that will bring them few direct short-term benefits;
- Distrust and lack of community cohesion are common obstacles to people supporting interventions, without direct incentives (usually cash payments or food). This is especially evident in some populations with mixed origins, and also where wealth and landholdings are highly unequal;
- Sometimes interventions are sabotaged. For example, some people, who do not have fields adjacent the protected areas, make holes in walls or paths through trenches to maintain access into the protected area;

- Due to the manner in which a project was devised and implemented, local people lack sense of ownership and responsibility for an intervention to maintain it. In many cases, communities have become skeptical; they welcome new interventions not as a means to address problem animals, but as a means to gain other opportunities such as cash payments for their labour;
- There is a clear sense of injustice and anger – that they are victims of conservation policies and practices that benefit others. Such local farmers resent any expectation that they support interventions as they have already 'paid enough';
- Shortcomings in intervention management, mainly, limited transparency and trust. Intervention projects have often side-lined traditional leadership and institutions with established legitimacy among local communities. Consequently, these institutions do not enforce the interventions;
- Available resources are deemed inadequate to address the problems. Local government, although mandated to implement problem animal interventions, lacks sufficient capacity (manpower, expertise and finance). Local people expect the central government and conservation authorities to take the primary responsibility;
- Most local farmers recommend that more resources be made available to local communities for proper maintenance of interventions. The local people are adamant that government needs to take more responsibility for addressing and managing these problems – by offering payments or compensation or through direct control and responsibility for the interventions.

Sheil and Akampulira (2012) conclude that Human-Wildlife Conflict interventions require care and investment if they are to succeed. Currently, many agencies emphasize quantified targets. For example, many organizations work-plans specify the length of live fence to be planted or of trenches to be dug. Issues that are important in intervention quality, especially community buy-in, roles and long-term support, receive insufficient attention. Lasting benefits seem only when emphasis is placed on the interests and role of communities themselves, and on the longer-term process of managing and maintaining the interventions.

Communities will not have a sense of ownership if they are excluded from the process that select, implement and maintain these interventions. To improve the

chances of success, attention must be given to the views, choices and role of the intended local beneficiaries themselves.

The Ugandan government has promised more financial support for interventions, and this offers opportunities for progress. However, to succeed, interventions need more than funds; they require community engagement and support.

Community engagement and support can be achieved by (Sheil & Akampulira 2012; Akampulira 2011):

- Community members affected by problem animals (and by extension the intervention) should be clearly identified. They should be the focus of all discussions.

- Community members should actively choose the most locally appropriate interventions and give consent to the manner in which they will be implemented, managed and maintained, decreasing dependency on 'outsiders';

- The requirements, delays and risks associated with each intervention should be recognized and discussed before any implementation. Cross-visits can effectively promote such awareness. Such visits create an opportunity for community members to examine interventions elsewhere. This in principle allows the communities to weigh the benefits and costs before taking on the intervention;

- In any larger intervention, formal agreements on roles and responsibilities should be negotiated, documented and signed. Agreements should allow flexibility (e.g. renegotiation every 3 years). For example, during the introduction of Mauritius thorn in BINP in 1994, local communities, local governments and UWA signed MoUs on its subsequent management, but there were not followed as had been stipulated and have since expired and not been renewed..

- Mechanisms to ensure the sustainability of key resources, such as equipment and incentives, need to be developed. Government (or other agencies) should develop, implement and support such mechanisms;

- Traditional and local approaches that are effective should be recognized, promoted and strengthened. Local costs associated with these

approaches should be reduced where possible (e.g. less pressure for school-age children to contribute);

- A combination of interventions should be encouraged;
- Local oversight of interventions should be formally entrusted to small and homogeneous management groups. Ideally, these groups will consist of individuals who know each other and experience the same problems. Preferably, these groups can be incorporated into traditional institutions that already foster cooperation, such as the stretcher groups in southwest Uganda (these groups carry those too ill to walk to medical attention);
- Such management groups should have the ability and authority to enforce the agreement and penalize those who seek to undermine it. There needs to be a body that can handle disputes and appeals. Community members should agree on all official roles. These roles should be documented and, where possible, recognized and supported by local authorities;
- There is a need to monitor, adapt and modify interventions. Intervention management groups should be monitored and evaluated regularly by an external institution and they should be held accountable to their agreements. Improvements to both the interventions and the agreements should be sought, documented and promoted;
- Policies to help communities address Human-Wildlife Conflict must be flexible and adaptable to local circumstances, including community concerns and needs. Often, sustained help will be required;
- Communities differ in their ability and willingness to implement and maintain communal interventions. In some cases, success may seem doubtful without major efforts to increase social capital (potential for collaboration) or to offer sufficient individual incentives.

7. IMPACTS OF THE HUMAN-WILDLIFE CONFLICT INTERVENTIONS ON PROTECTED AREAS

No specific study has been done on the impacts of the Human-Wildlife Conflict interventions on the protected areas in the GVL. However, there are several studies elsewhere in similar ecosystems in Western, Eastern and Southern

African regions where interventions to prevent wildlife from getting out of the protected areas have been in place for a very long time In protected areas that are already isolated by complete habitat loss outside their boundaries, the Human-Wildlife Conflict interventions, especially the physical barriers which impede or prevent wildlife from leaving protected areas, contribute to increasing isolation of natural areas that are already inadequate in size to maintain ecosystem processes (Newmark 1996). Social analysts also critize attempts to erect barriers between people and wildlife (Adams & McShane 1992).

Newmark (2008) has reviewed field studies that have been conducted over the past decade to understand the effects of restricting movements of wildlife into and out of protected area and creating sinks (i.e. sites with unusually high wildlife mortality rates) in the increasingly human-dominated matrix that surrounds most protected areas. Fences have been used by wildlife managers in Africa to prevent the transmission of diseases between wildlife and cattle and provide additional security for threatened species. Currently, an array of fences are being created around protected areas to prevent wildlife from crossing to people's fields and causing damage to crops and/or causing injury/death to humans living adjacent the protected areas. These barriers are an important cause of isolation for African protected areas.

Throughout Africa, the impact of the fencing has been a severe decline of large mammal populations like the wildebeest (Berry 1997; Whyte & Joubert 1988; Spinage 1992) zebras (Williamson & Williamson 1985) and hartebeest (Spinage 1992) largely due to the fence blockage of migratory routes to the remaining water sources during the periods of severe drought.

As protected areas in Africa becoming increasingly isolated by fences, species losses within the protected areas will be inversely related to reserve area. Thus, reserve area have been found to be a critical determinant of large mammal persistence in African protected areas of northern Tanzania (Newmark 1996), Ghana (Brasheres *et al.* 2001) and East Africa generally (Woodroofe & Ginsberg 1998).

As many protected areas become isolated and ranges of large herbivores compressed, plant community structure and diversity have often changed as a result. The degree to which vegetation cover and diversity are altered is related to the relative isolation of large herbivores (Van de Vijver *et al.* 1999).

A further indirect effect of protected area isolation by fences will be the restriction of the ability of plant and animal species to relocate to new geographic areas in response to global climate changes because of absence of dispersal (Thomas *et al.* 2004).
As wildlife populations in African protected areas become increasingly isolated by fences, interactions between protected area isolation and human activities and natural processes within and adjacent to protected areas can create feedback loops that intensify negative impacts on wildlife populations. In Ghana, where commercial bushmeat pressure is intense, extinction rates are far higher than in Tanzania where commercial hunting pressure is less intense (Newmark 2008). Ungulate populations in isolated protected areas are unusually susceptible to high levels of predation (Tambling & du Toit 2005).

8. OPPORTUNITIES

- There is now a wide range of Human-Wildlife Conflict mitigation tools and techniques that has been piloted and proved to be effective in deterring majority of the problem/vermin animals. They are cheap to implement and maintain, even by the local communities, use low technology therefore can be easily scaled up to other sites in the protected area and to other protected areas in the region. Sites where the interventions have been successful can be used as 'learning centres' for other protected area managers and local communities, who are yet to implement the specific interventions, to learn from;
- Problem animal control is now being formalized and institutionalized as an integral part of Protected Area programs like law enforcement and tourism (Kalpers *et al.* 2010). The activities of Human-Wildlife Conflict fall under the Community Conservation Department for most protected areas and there are provided for in the annual operations budget of the protected areas which ensures sustainability in terms of organizational structure and financial viability. There is a possibility of using part of the tourism revenue-sharing funds to initiate, implement and maintain human-wildlife interventions once new/revised revenue-sharing policies are adopted. Until recently problem animal control represented a secondary duty for the rangers after law enforcement (Baker 2005). Decisions about whether or not to assist farmers by scare shooting or chasing wild animals from agricultural fields fell to individual rangers already engaged in full time responsibilities, yet lack of assistance for crop raiding animals

remains a principal charge against the protected areas by affected communities;

- National governments are showing relative interest in Human-Wildlife Conflict by bringing in the much required resources. In Uganda, the National Development Plan (2009) prioritizes the implementation of lasting solutions to Human-Wildlife Conflict. In 2010, a Presidential Directive explicitly tasked the Ministry of Tourism, Wildlife and National Heritage, with establishing the funds and mechanisms needed to tackle the problem. The ministry gave money for excavation of some of the trenches in QEPA. The Ministry of Agriculture has also taken interest in spear heading the tea planting program in the buffer zone to the south of Bwindi. In Rwanda, the government has passed legislation on compensation for animal damages and injuries. In DR Congo, there is a Ministerial Directive to ICCN to look into modalities of compensation due to wildlife damages;
- Some of the interventions are multipurpose. Bee keeping and Pepper Chilli, for example, in addition to acting as a deterrent to elephants, can provide extra income to the local people through the sale of honey and fresh pepper. Excavation of trenches provides extra income to the rural poor with few options for income generation. In addition, small grants to ANICO and HuGo members are extra benefits that can act as an incentive to the local communities that can easily lead to uptake and sustainability of the interventions;
- There is a greater likelihood of improved livelihoods, food security and reduction in poverty by the local people being able to fully utilize their land after reduction in frequency of animal raids. Evidence for this is from the land in MGNP that had been abandoned due to the frequency and amount of damage by buffaloes and/or fear of being injured by animals but the fields are now being farmed throughout the year;
- Reduction in crop loss and injuries/deaths due to protected animals has a great potential of improving relationships between protected area management and local communities. This is evidenced by local communities assisting in law enforcement and fire management in areas where crop raiding has been contained;
- Community-based problem animal control associations (like HuGo [GMRT], Crop Rangers, ANICO) provide a stable forum for regular dialogue and

negotiation between community representatives and protected area authorities even for other issues not related to Human-Wildlife Conflict management. Because of regular interaction between these groups and protected area management, both gain confidence in each other and therefore, there is free exchange of information and ideas;

- Karisoke Research Centre in Volcanoes, Rwanda, Max Planck Institute of Evolutionary Anthropology and John Justice Tibesigwa in Bwindi, Uganda, have plans or ongoing research to determine what makes habituated mountain gorillas move and spend more time out of the parks than they did only a few years ago.

9. LESSONS LEARNED

- No single intervention is a stand-alone solution to Human-Wildlife Conflict (Chhetri *et al.* 2004; Naughton-Trevis 2001; Hoarse 2012). One or more interventions are required to complement each other in order to completely deter animals from getting out of the protected area. In Volcanoes, the stonewall is complemented by a trench on the inside, in QEPA, Uganda, the

Figure 15. Clockwise: a stonewall is complemented by guarding along the Uganda/DR Congo border; a trench complements a stonewall in Volcanoes, Rwanda; roller gates across public roads in QEPA, Uganda, where trenches cannot be dug; and a metallic bar

under a bridge across a river in Mgahinga, Uganda, where a stonewall cannot be constructed

trenches are supplemented by guarding, scare shooting, beehives, and gates across public roads, while in Kibale, the trenches are supplemented by bee hives, Red pepper chilli, scare shooting, guarding and occasionally by buffer crops such as tea;

- Having an intervention in place does not entirely eliminate the animal raiding problem but could merely divert it elsewhere; therefore interventions need to be continuous all round the park instead of short, fragmented sections (Chhetri *et al.* 2004) in areas most troubled by crop raiders or it might also be useful to identify the threshold criteria that determine whether or not animal raiders shift their effort to alternative locations so that the deterrent could then be accentuated over time to maintain deterrent effect (Hall & Wallace 2012);

- Local communities need to be involved in the process of selecting a mitigating intervention before it is implemented for them to own it (Trevis *et al.* 2009; Sheil & Akampulira 2012). According to Asuma and Byamukama (2004), this process requires patience and tolerance; also calls for transparency, discussion of plans, decisions and community development activities at the lowest levels (Musaasizi 2006);

- Problem animal control being a collaborative, participatory, community endeavor can act as a bridge for protected area management to deal directly with local communities and share experiences and challenges related to problem animal control and other wildlife conservation issues by working through problem animal control organized groups. Communities now realize that protected area management are willing to respond to their concerns and that joint park-community solutions are effective;

- Three factors lead to the acceptance and effectiveness of an intervention (Musaasizi 2006): real reduction in crop loss and injury to local people, education and sensitization leading to improved understanding of the conflict resolution process and the real and perceived benefits to individuals and the communities in general. For example, interventions which are multipurpose are easily adopted and sustained by the local communities by themselves. For example, colonized bee hives, which scare elephants and provide honey, have been well

adopted in QEPA and Kibale. Red pepper chilli is another intervention that is sustained by the local communities themselves in Kibale to drive away elephants and sell the green pepper. The chilli group in Kibale grew from 23 to 243 members in a period of less than two years because local people found it very rewarding as intervention against elephants and as source of extra income. But in Bwindi, where Red chilli is only used for scaring elephants, communities still expect free Red pepper chilli from the UWA, rent for them land for Red chilli nurseries and supply them with equipment like spades and hoes for setting up and maintaining nurseries;

- Protected area managers are better equipped to define appropriate management responses by understanding the local perceptions regarding crop raiding (Naughton-Trevis 2001): perceptions apparently reflect past or potential severe raiding events more than steady, small losses; people perceive larger animals as the worst pests, even though actual damage from small ones is worse; personal investment in crop or farming strategy will influence an individual's perception of risk; present conditions such as wildlife belonging to government limit peoples coping strategies; local residents perceive large and potentially life threatening animals such as elephants and gorillas to be responsibility of wildlife bodies;

- Most of the interventions require a shared or collective response from those affected. Given that majority of the local farmers have small land holdings adjacent the parks, they need to cooperate in order to have a deterrent effective;

- Raiding is an emotive issue around all the protected areas in GVL and people are prone to exaggerate the impacts they face either in hope of compensation or as a way of expressing their dislike for the existence of the protected areas. For example, Plumptre *et al.* (2004) found out that community members living in several parishes not bordering Bwindi forest, Uganda, claimed they had problems from crop-raiding species such as baboons and bush pigs and it is very unlikely they do have the problem. Also, a study of crop-raiding around Volcanoes, Rwanda, showed that animals rarely move further than 100 m forest edge, although occasionally they can move up to 1 km. However, a questionnaire survey carried out in

1996 showed that people complained about raiding up to 3 km from the park (Plumptre *et al.* 2004).

10. RECOMMENDATIONS

The following are suggestions and recommendations we synthesized from the information we collected:

- Community members affected by problem animals (and by extension the intervention) should be clearly and urgently identified. They should be the focus of all discussions.

- Revenue sharing funds should be channeled into issues that are directly linked to wildlife such as the Human-Wildlife Conflict prevention and mitigation measures as a matter of priority rather than common good community projects like building schools, roads, and health centres, IGA etc as is currently the case;

- A special fund should be created for compensating human injuries and deaths. These are not so common but need to be promptly addressed;

- No Human-Wildlife Conflict intervention should be implemented without full participation of the local community whom it is intended to assist. This could make the selection process of a preventive and mitigation intervention implementation take long but is a necessary evil to make the intervention a success. The communities are presented with all possible types of interventions and weigh the relative merits of the alternatives with standard criteria (Trevis *et al.* 2009). The first critical step is to define the cause-and-effect relationships underlying a given human-wildlife. This step helps expose multiple focal points of intervention. Interventions can be proposed by conservation managers based on their experience and from literature and local community members can also suggest additional interventions. Then, the candidate interventions are evaluated based on three criteria (Trevis *et al.* 2009):

    i) *Cost-effectiveness* – considers the resources, time and expertise needed to install and maintain the intervention in its effective form. Effectiveness must be evaluated against the goal, which is either to reduce the frequency or severity of encounters between

wildlife and people or raise tolerance among people for wildlife encounters/damages;

ii) *Wildlife specificity and selectivity* – are the effects of the intervention on targeted problematic animals and unintended targets;

iii) *Sociopolitical acceptability* – this is the tolerance for the installation, maintenance and consequences of the intervention among affected individuals and households.

A thorough knowledge under which each candidate intervention is more or less effective is a valuable prerequisite for this participatory approach to succeed. The following are candidate prevention and mitigation measures for each protected area and the conditions where there are a more effective deterrent against problem animals. This is based on reports from protected areas and discussions with park managers as detailed in Appendix 2. Further, prioritisation and refinement can be made by park managers and community members based on the above criteria:

Suggested deterrents against wildlife in Queen Elizabeth Protected Area, Uganda

Intervention	***Rationale***	***Comments***
Roller gates	This is a deterrent to elephants using public roads within the park Elephants generally avoid gates	This intervention may require having ranger posts on the gates to open for vehicles that will be using the public roads at night
Chain link fences	This is a deterrent to elephants using rivers to cross from the park to community fields	This deterrent needs to be made of materials strong enough to deter elephants, but UCF (2008) warns that the deterrent must have appropriate drainage provision to allow free flow of natural water courses, measures for prevention of blocked drainage and for alleviating sediment collection
Live fencing with Mauritius thorn hedge	This is a deterrent to elephants using valleys where a trench cannot be excavated and rocky areas as well as steep hill slopes where a trench of required size cannot be dug; It can also be used deter baboons	There need to work with and train the local people in managing the Mauritius thorn for it to be effective and prevent it from being invasive
Concrete barriers	This is a deterrent to elephants using sites where a trench cannot be excavated	Very expensive. Can be used on sites where other interventions are impossible

Chilli pepper	This is a deterrent to elephants that can be used, especially near homesteads, but where other interventions are not possible	This has proved to be successful in nearby Kibale National Park and could be piloted in QEPA. Could eliminate human guarding especially when crops at at a stage when the most vulnerable to animals raids
Bees hives	This method can complement the trenches, especially where the latter are destroyed by elephants	Has had tremendous success in some sites of QEPA. It should be scaled up to other areas prone to elephant raids
Trenches	Should be extended to areas still prone to elephant raids	Local communities have bought the idea of trenches. They should be scaled up to the communities that are demanding them

Semuliki National Park, Uganda

- Dig trenches in areas affected by elephants, avoiding water logged areas where trenches cannot be dug
- Expand the Mauritius thorn hedge. Avoiding shaded areas, rocky soils and water logged areas,
- Pilot other interventions such as beehives, red chilli in areas where trenches and Mauritius thorn cannot be established
- Continue to engage local government on management of the vermin animals

Mgahinga Gorilla National Park, Uganda

- Extend the wall to areas not yet covered
- Rise the height and width of the wall to make it more effective
- Use cement and mortar to strengthen portions of the wall that are susceptible to buffalo destruction
- Strengthen the whole length of the wall by planting *Erythrina abyssinica* on both sides of the wall as it has been done in some parts. This will prevent the wall collapsing on its own weight, people making holes through to get to the park and buffaloes pushing it down;
- Explore the use of chain links in areas where a wall cannot be built like ravines and gorges;

- Continue working with the community to repair parts of the wall that are destroyed by people and buffaloes;

Bwindi Impenetrable National Park, Uganda

- Expediate the process of planting tea in the Nkuringo buffer zone as has been agreed with the communities;
- Encourage bee hive fences along the park boundary in areas affected by elephant raids. The areas affected are coincidentally the ones where bee keeping is permitted under the multiple use program, which should make the process easier since the communities are allowed to place their hives in the park. Occupied hives should be the ones to use
- Scale up the use of red chilli in elephant prone areas. Should liase with management of Kibale National Park, to explore markets for fresh chilli. Training of communities on how to handle the chilli so that it has no negative impacts on community members preparing it is required;
- Scale up the planting of Mauritius thorn on the park boundary. Experiences acquired from parishes bordering the northern sector should be used in other parishes of the south sector;

Ruwenzori National Park, Uganda

- More effort should be put in the participatory approach to problem animal control methods;
- Scale-up the planting of Mauritius thorn live fence along the boundary of the park

Volcanoes National Park, Rwanda

- Extend the wall to areas not yet covered
- Extend the trench to areas where the wall cannot be constructed
- Rise the height and width of the wall to make it more stronger
- Use cement and mortar to strengthen specific portions of the wall that are susceptible to buffalo destruction
- Strengthen the whole length of the wall by planting *Erythrina abyssinica* on both sides of the wall as it has been done in parts. This will prevent

the wall collapsing on its own weight, people making holes through to get to the park and buffaloes pushing it down;

- Explore the use of chain links in areas where a wall cannot be built like in ravines and gorges;
- Work with the community to repair parts of the wall that are destroyed buffaloes;
- Experiences from the compensation scheme should be noted so that they act as a learning experience to the conservation managers in the region

Virunga National Park, DR Congo

- The park covers a vast area and is surrounded by a very low human population density because of displacement by war. This makes raiding animals travel long distances through unoccupied land to raid. Therefore, electric fences need to be extended to other areas not covered. Local communities need to participate in maintaining the fence to reduce on the operating costs;

Other issues that need to be considered are:

- Monitoring data collection and analysis especially recording of animal raids, where they occur, and amount of damage need to be improved. Data held by the Community Conservation Departments about Human-Wildlife Conflict are frequently old or one off, suggesting that there is no clear system for analysing the data collected in the field. The recording data is now taken for granted, and there is little or no interest in scientifically understanding animal excursions in the field. The net result of this situation is that there is in essence no baseline data collection system currently in place that can be used to reduce to assess Human-Wildlife Conflict and increase management performance over time. This information gap is a cause for concern;
- There is need to train and motivate a few selected people from the local community based groups to do the data recording. In Volcanoes, Rwanda, those selected few that collect the data are paid a small incentive fee. This assists in understanding what is happening in the field, assists in decision making, allowing park management to follow trends in the interventions, and use the information obtained to communicate to other

stakeholders, including donors on the successes and failures of interventions.

- Scientific research need to be undertaken on changes in the vegetation inside and outside the protected areas - biomass, nutrient status, structure etc to understand why some wildlife like gorillas that previously used not to come out of the forest are doing so now. Although research on Human-Wildlife Conflict does not directly prevent or mitigate conflicts, it forms an integral part of almost any 'package' of counter measures, actions or schemes, and should be one of the first courses of action.
- Musasizi (2006) suggests more incentives to problem animal control groups like periodical rewards, contribution from other organizations; preference in offers of part time employment like porters – boundary maintenance, carrying tourist luggage, etc. It is important that when choosing incentives they should be sustainable in the long term;
- Majority of the interventions and their activities being undertaken are not grounded in any official policy, laws, or guidelines. The operations of Human-Wildlife Conflict mitigation measures are regarded as exploratory and ad hoc by park management (Musaasizi 2006). The interventions have been pilots, though it is clear from park management that the time for experiments is now over. Policy and guidelines for the cornerstone of a long term organised response to human-gorilla conflicts; if these are not developed it will undermine the joint problem solving approach developed to date. It is imperative that guidelines and policy for responding to human-gorilla conflicts be developed from the lessons learned so far and the current collaborative approach be institutionalised through a Memorandum of Understanding with the concerned community groups and local governments. The majority of respondents voiced the need for institutionalising the HUGO programme as a collaborative arrangement for minimising conflict between gorilla and their human cousins, many proposed that the MOU should prescribe roles, responsibilities and rewards of GMRTs. Recommendations on how this can be achieved should be developed and modifications adopted accordingly;
- For any compensation scheme to be successful, the following need to be in place before the scheme is implemented (Nyhus *et al.* 2003): prompt and fair payment, sufficient and sustainable funds, clear rules and guidelines,

including strong institutional support and site specificity to cater for differences in raiding species and culture specific issues.

With better conservation related schemes such as law enforcement, conservation education/outreach, tourism, community-based income generating projects, reduction of human-wildlife-livestock disease interface, the populations of wild animals within the parks are expected to increase dramatically through reproduction and enhanced survival. The human population around the protected is also expected to continue to grow and expand. This is likely to make the Human-Wildlife Conflict more severe and widespread in time and space. To solve this problem might require multi-pronged long-term strategies that are beyond the conflict-zone around the protected areas:

- First, there is need for a compensation scheme to be locally administered. To try to avoid the pitfalls of centralized compensation (low government funding, resources to verify rising claims, monetary inflation etc) the model should be designed to operate around community-based organizations that are partially based on community-funded financial schemes as is being done in Tanzania (Hoarse 2012). This would quicken the compensation process and the local people would view the compensation as fair as it will be based on local circumstances. The idea of consolation fund has been piloted in QEPA, Uganda, where park management and local authorities agreed to save five percent of the annual rev*enue sh*aring money to purposely cater for human injuries and deaths (Benon Mugerwa Community Conservation Warden, QEPA *pers comm.*). If the consolation money is not spent in a given year, it is ploughed back into the revenue sharing account. This experiment needs to be carefully studied, improved and made into policy;

- Second, there is need to formulate land use policies or reform existing ones to discourage agricultural expansion, and human settlement in lands adjacent to protected areas and establish wildlife corridors between the protected areas. The long-term success of such strategy is highly dependent upon local community support. Newmark (2008) argues that these goals are achievable by giving the following examples. In Tanzania, the government, with donor and NGO support is attempting to reconnect the nine largest blocks of forest in East Usambara Mountains by means of wildlife corridors (Newmark 2002). These corridors will be established by

extending forest reserve boundaries and regenerating forest within existing gaps. Also, the African Wildlife Foundation through their Heartlands Program (Muruthi 2005) and Wildlife Conservation Society through their landscape-wide conservation initiative (WCS 2009) are focusing on protecting dispersal zones and establishing corridors among protected areas through the creation of partnerships with local communities, government authorities and other non-government organizations. Implementation of such policies is expected to reduce or even eliminate Human-Wildlife Conflict completely;

- Lastly, there is need to look into ways the vermin and problem can be made to instead generate revenue. Activities like sport hunting of these animals or adding value to trophies derived from these animals need to be explored. The revenue generated would go directly to the local people affected. A case in point is the sport hunting scheme of specific species found on local farmers land around Lake Mburo National Park, Uganda. This scheme needs to be studied to judge its impact on conservation and local community attitudes towards wildlife.

11. CONCLUSION

Human-Wildlict Conflict interventions require care and investment if they are to succeed. Currently, many agencies emphasize quantified targets. For example, many organisations' work-plans specify the length of fences planted, walls built or trenches dug. Issues that are important in intervention quality, especially community buy-in, roles and long-term support, receive insufficient attention. Lasting benefits seem likely only when emphasis is placed on the interests and role of the communities themselves, and on the longer-term process of managing and maintaining the interventions.

Communities will not have a sense of ownership if they are excluded from the processes that select, implement and maintain these interventions. To improve the chances of success, attention must be given to the views, choices and role of the intended beneficiaries themselves.

There are promises of funds from governments and conservation organizations to support the interventions. However, to succeed, the interventions need more than funds; they require community engagement and support. Our study suggests recommendations to support these goals.

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ANNEX 1. People contacted

Name	Organization	Location	Country
Benon Mugerwa	Senior Warden, Community Conservation, QEPA	Katungulu	Uganda
Francis Mbowa	Senior Warden, Community Conservation, RMNP	Kasese	Uganda
Polycarp Mwima	Project Manager, WWF, RMNP	Kasese	Uganda
Norah Mbubi	Community Conservation Ranger, Kibale	Kabarole	Uganda
Sanyu Mukidadi	Chairman, Chili pepper growing association, Kibale	Kabarole	Uganda
Moses Kibwindi	Community Conservation Ranger, Kibale	Kabarole	Uganda
Olivia Biira	Community Conservation Warden, BINP	Buhoma	Uganda
Deus Twinomugisha	Community Conservation Ranger, BINP	Buhoma	Uganda
Christopher Masaba	Senior Warden in Charge, MGNP	Ntebeko	Uganda
Charles Okuta	Community Conservation Warden, MGNP	Ntebeko	Uganda
Joseph Tibiringirwa	Community Conservation Ranger, MGNP	Ntebeko	Uganda
Abel Musana	Warden Research & Monitoring, PNV-RDB	Kinigi	Rwanda
Oreste Ndayisaba	Warden Community, PNV-RDB	Kinigi	Rwanda
Andrew Plumptre	WCS Albertine Rift Program	Kampala	Uganda
Felix Bigirimana	Director, Karisoke Research Centre	Musanze	Rwanda
Benjamin Mugabukomeye	IGCP Conservation Incentives Officer	Musanze	Rwanda
Deo Tusiginze	Coordinator, Biodiversity Program	Musanze	Rwanda
Nobert Mushenzi	Deputy Director, PNVi/ICCN	Goma	DR Congo
Joel Wengamulay	Coordinator, PACEBCO	Goma	DR Congo

ANNEX 2. Question guide

The following questions were used a guide to the interviews, discussions and consultations we held with people and organizations dealing in Human-Wildlife Conflict management.

1. Is there a problem of wild animals leaving the park to the surrounding local peoples' community fields?
2. If yes, please rank all the problem animals starting with the most destructive
3. Please also rank the problem animals in order of how they frequently leave the park, starting with the most frequent
4. For each of the problem animals you have mentioned above, please list the intervention(s) in place to prevent the animal from leaving the park.
5. For each of the interventions you have listed above please provide the dimensions such as length covered, width, depth, number of people involved in implementing and maintaining it
6. How do you ensure sustainability of maintaining and managing the intervention?
7. What are your sources of funding for Human-Wildlife Conflict interventions and management you have implemented so far?
8. Please mention the financial costs incurred in establishing and maintaining each of the above mentioned interventions
9. For each of the interventions briefly describe how, why and when they were introduced
10. Briefly describe the challenges experienced for each of the interventions
11. Mention the success that has been experienced with each of the interventions.
12. How do you measure the success of each of the mentioned interventions in terms of reducing problem animals impacting on local people
13. How do the national policies/laws in your country address the issue of Human-Wildlife Conflicts?
14. How collaborative is the management of Human-Wildlife Conflict issues in your park with regard to local communities, central government, NGOs, the local government. What are roles and responsibilities of each, if any
15. What are some of the lessons you have learned in dealing with Human-Wildlife Conflict management situations?

16. What are your future plans as regards Human-Wildlife Conflict management
17. Finally, please avail us with any available documentation, reports or publications, data sheets on Human-Wildlife Conflict

THANK YOU FOR YOUR TIME AND THE INFORMATION

ANNEX 3. A summary of the Human-Wildlife Conflict interventions in GVL

A summary of the animal raid deterrents around Queen Elizabeth Protected Area, Uganda

Intervention	*Target animal*	*Site selection criteria*	*Dimensions of the intervention*	*Observation*	*Strengths*	*Challenges*	*Cost/Source of funding*
Trenches	Elephants and other non-jumping mammals	Prone areas based of frequency of elephant raids and pressure from the local communities affected	7ft (2.1m) wide and 5ft (1.5m) deep (but in Ishasha Sector the trench is 2m width × 2m depth, UCF [2008]) 85 km length of trench dug in the districts	Communities enthusiastic and participating because they are aware of the effectiveness of the deterrent based on evidence in areas where the intervention were piloted	Has reduced crop raiding incidences and complaints by about 60% Local community members gain directly by being paid to excavate the trenches; Leads to improved park-community relationships;	Trenches cannot be dug across public roads, rivers, wetlands, valleys, or on steep hill slopes, and rocky areas Trench often diverts the elephant problem elsewhere, leading to the need for a continuous trench all around the park Silting and damming of trenches during heavy rains Elephants being able to cross at some points on the	US$2.8/m length excavated (excludes cost of tools and allowances for officials). US$80/person per month per village for regular maintenance US$ 1.6 – 2/person per metre in areas where

			of Kasese, Rubirizi, Kanungu and Rukungiri. Trench yet to be excavate d in Mitoma District			trenches by destroying the trench banks or where people illegally cross the trench going in and out of the park Costs of maintenance the already dug trenches are high	the trench have been poorly maintained Funding from the Min. of Tourism, Wildlife and Antiquities, Uganda Conservatio n Foundation, CARE-REPA and UWA
Bee hives	Elepha nts		100 bee hives placed in a straight line in three different valleys of Ishasha sector,	Local community members confirmed that the intervention is very effective against marauding	Compliments the trench	Market for honey if it is ever produced in commercial quantities	UWA???? supplies modern bee hives

			Rukungiri district; and 60 bee hives placed haphazardly in Jacana area of Bunyaruguru in Rubirizi District	elephants			
Scare Shooting	Elephants and buffaloes	Response by UWA and UPDF to animals leaving the park		Done together with other interventions like chilli and making noise by local communities	Shows the commitment of UWA to stopping crop raiding	Elephants are getting used to the sound of guns and return after a short time	UWA operational budget
Guarding	Elephants and buffal	Done by owners of the field or they	Along an individual's field		Compliment the trench and done where there		

	oes at night Baboons during the day	hired labour			no intervention has been established		
Chain link fence	Elephants		All around the farm	Personal initiative of a prominent and wealthy farmer	Reported to be effective against elephants	Very expensive for ordinary farmers	Personal budget
Tree planting along the trench on side of agricultural land	Elephants	Sites along the trench that are prone to elephant destruction	Along the trench	Complements the trench. Trees should not be planted on park side of the trench as they will be destroyed by elephants	Stabilizes the banks of the trench so that it cannot be eroded; Makes the trench appear deeper to the animals?????		
Compens	Victim			Consolation	Leads to good	Contravenes UWA	Five percent

ation (Pilot)	s of lion, leopard, crocodile, buffalo or elephant attack			fund limited to deaths caused by wild animals and medical bills for injuries to people by wild animals Managed by a committee on which Conservation Area Manager and Community Conservation Warden and Chairman of CPI are members	relationship between the park and people as previously nothing was given to bereaved family or injured person	policy and laws Potential for abuse of laid down procedures; Scheme could become unsustainable in long-run	of any amount released for revenue sharing, if not used in a financial year the money goes back the revenue sharing fund
Water cages	Crocodiles	Areas prone to crocodile		Compliments community sensitizatio	Allows local people to fetch water		US$24,000 from revenue

		attacks		n	from lakes and channel without fear		sharing
Education	Large carnivores	Fishing villages and communities around the park			People learn how to avoid being injured/killed by predators and their livestock being preyed upon	People keeping livestock in fishing villages and those who keep grazing in the park	UWA operational budget

A Summary of the animal raid deterrents around Bwindi Impenetrable NP, Uganda

Intervention	***Target animal***	***Site selection criteria***	***Dimensions/size of the intervention***	***Observation***	***Strengths***	***Challenges***	***Cost/Source of funding***
Chasing/Herding	Mountain gorillas, elephants, baboon	Areas where wild animals are frequently going	8 groups (95 members) spread over 7 parishes around	HuGo members are volunteers selected from	Perceived by park management and local people as a success in reducing	Communities expect HuGo members to be guarding all the time, thinking they are salaried; Animals get	Planning workshops, training in chasing methods and business development

	s, bush pigs and other problem animals	out of the park	park	frontline homesteads by forest edge communities and trained in chasing methods, (ringing bells, whistling, shouting and herding), fire management, business development, GPS use, intelligence gathering	crop loses to wild animals; HuGo members can act as a model for the link between public health and conservation for the improvement of public health initiatives within communities surrounding the park and beyond; Each HuGo member given seed	habituated to particular chasing method so there is need to continually innovate chasing methods; Lack of skills in filling the monitoring data sheets, sometimes give narrative reports; Levels of hygiene and sanitation of HuGo members and their homes are inadequate, the disease transmission to gorillas and other wild animals is high; Over time, HuGo members spend considerable time guarding or chasing gorillas at the	; Provision of equipment (boots, rain gear, pangas, GPS) and, when on duty, food rations (beans and maize flour) to HuGo members; US$9,333 disbursed to HuGo members to help them start business enterprises so that they are motivated

				and communication skills; Started in September 1998 for chasing mountain gorillas but since 2007 they also chase other problem and vermin animals; Not allowed to kill vermin animals	(US$215) money to start IGA to compensate for lost time since they are not paid wages for their work Formation of a CBO/SACCO to unite HuGo members and act as vehicle for development through pooling of financial resources weekly and the collection	expense of catering for the needs of their households Grant money given to members for business ventures instead invested in domestic problems like sickness and marriage ceremonies; Elephants and bush pigs usually come out of the park at night, making chasing them difficult	

				like baboons because they are not recruited as vermin guards; Reduce the interface between humans and wildlife especially, gorillas, as any exposure increases chances of disease transmission, which is	being given to one or two members on a rotational basis paid back at a very low interest rate, hence improvement in morale for voluntary chasing of raiding wildlife;		

				considered to be one of the greatest threat to the survival of the mountain gorillas; Conceived as a basis for addressing crop raiding in the short term but improving relations with local people in the long term			
Buffer	Mounta	In	12km long	Outer	Effective in	Gorillas able to	US$400,00

Zone	in gorillas	Nkuringo and Nteko areas as chasing of gorillas from community fields to the park was unsuccessful because of presence of many wild groups and Nkuringo gorilla tourism group was still being habituate	and 350m wide (4.2km^2); Divided into two parts: inner (2.4km^2) managed by UWA and outer (1.8km^2) managed by communities and UWA	part used for growing crops not palatable to gorillas and other problem animals; Inner part – trees are cut so that the area does develop into a closed forest	reducing human-gorilla conflict;	forage beyond the 350m buffer zone; The process to establish a long term land use plan for the buffer zone has been tedious and slow; Pilot crops in outer zone have not been successful (*Artemisia annua* – because the factory in Kabale closed at time of second harvest; Barley – first harvest good, second crop devoured by bird pests; Lemon grass – factory in too far (~150km) therefore not economical to transport lemon	0 for purchase of land

		d				grass as it was grown at a small scale; Pasture – community given heifers but cumbersome to carry pasture because of distance Un-habituated groups ranging close to the park edge have grown less fearful of people, these particular groups still cause a great deal of fear within the population; Have conditioned gorillas to remain within certain limits when outside the park boundary	
Live fencing	Elephants,	Along the park	32.7 km of live fence	Management and	Effective where the	Gap, due to some individuals refusing	UWA provides

with *Mauritius* thorn hedge	gorillas, baboons, bush pigs	boundary in areas chosen by communities in agreement with UWA	(30% of park perimeter)	maintenance by communities still vital	fence is well established; Saves time to do other work	to plant the fence on their land, rocky/barren areas, marshy places and shading by trees branches in the park; Young shoots being uprooted by baboons	seeds, rents land for nursery and provides equipment for managing the nursery and hedge
Scare shooting	Elephants, baboons	On sites where local fields have been raided or are about to be raided and message sent to rangers		Compliment guarding and chilli pepper	Effective if park rangers respond promptly	Elephants get used to the gun shots so that they are no longer scared but now attack the shooting rangers; Baboons just go at the edge of the forest and go to the community fields once the rangers leave; Travelling long distance to ranger posts to report raids	UWA operational funds

Guarding	Elephants, baboons	Gardens closer to the park and prone to animal raids			Effective against baboons if done throughout the growing season	Elephants and bush pigs raid mostly at night therefore hard to control; Require shelter and fuel wood to keep warm during the rainy periods and at night; Done by children during the day who end up having poor scholastic achievement	Funded by owners of the fields Sometimes UWA allows people guarding against elephants at night to collect firewood from the park
Red pepper (Chilli)	Elephants	Across elephant park exit paths		Chilli is burnt together with saw dust/cow dung in a tin and the emanating pungent smoke repels	Highly effective in repelling elephants; Requires little manpower; Chilli has other uses such being a cash crop,	Lack of skills (pasting and drying) and basic equipment (masks, gloves)for use when preparing the materials Rain washes off the hot chilli; Lack of enough	UWA supplies seeds, rents land for nursery and provides equipment for maintaining the nursery

				the animals; Chilli mixed with used engine oil/cooking oil and mixture soaked in old rugs which are hung evenly on a string and placed across known animal paths;	and can be used locally as an appetizer Chilli can be grown locally as it can be intercropped with other crops It is light weight	materials; Effectiveness of the technique depends on the direction of the wind	
Live traps	Baboons	Areas most prone to baboon raids	12 active traps	Complements guarding	Very effective for baboons compared to the live	Works for a short time as baboons will recognize it as a trap once it captures one or	Construction estimated at US$80 (Masiga *et al*. 2011)

					fence; Saves time to work on other things; Frees school going children Captures animal alive	two; Could potentially trap non-target species like chimps; Lack of construction materials e.g. nails, machetes, poles	
Tea as a buffer crop	Baboons, mountain gorillas	Areas where farmers have access to market tea to factories		Buffers food crops susceptible to animal raids and is a cash crop	Quite effective if planted over a large enough area and made continuous i.e. no footpaths, fallows or other crops in between	Small landholdings make people not grow tea as their small pieces of land are reserved for food crops	Kayonza and Kinsinzi Tea Factory and Min. of Agriculture gives soft loan/tea seedlings to local farmers to grow tea

A summary of the animal raid deterrents around Volcanoes NP, Rwanda

Intervention	*Target animal*	*Site selection criteria*	*Dimensions/size of the intervention*	*Observation*	*Strengths*	*Challenges*	*Cost/Source of funding*
Stonewall	Buffaloes	Red zones where buffalo raids are very common	76 km long; covering four districts	Maintained by Crop rangers with support from RDB and IGCP	Buffalo raids considerably reduced	Cannot be built on locations with ravines which leave gaps which animals can use	
Crop rangers	All raiding wildlife except mountain gorillas	4 sectors that are regarded as Red Zones where buffalo raids are common	250 volunteers organized in 4 sectors around the park	Also maintain the buffalo wall. One of them trained in data recording			Provided with equipment like flash lights, whistles Data recorder paid an incentive

Trench	Buffaloes	At weak spots along the stonewall and areas with no stones	1.5 m depth by 2m width	Excavated on the inside of the stonewall to compliment it	Increases the effectiveness of the stonewall	Some areas are rocky so the trench cannot be dug to required depth	RDB/IGCP funds the construction and maintenance
Compensation	All wildlife	Damage to property, injury or death to persons	All around the park	Damages to crops quantified, monetary compensation not yet done	Potential: Increased community appreciation of conservation and wildlife	Potential: Expensive and farmers could still incur income losses relative to those who have not been raided ; Guarding against fraudulent claims (Bulte & Rondeau 2005); Verifying that damage was caused by animals from the park (Nyhus et al. 2005); Farmers could lose incentive to protect	5% of annual tourism revenue

						their crops because they will be compensated; Quantifying the damage	
Chasing/herding	Gorillas	Sites where gorillas come out of the park	All around the park	Done by a team including veterinary staff, researchers, and tracking rangers	A short-term measure	Gorillas become habituated to being chased and stop responding	RDB/Kariso ke Research Centre
Education Animateur de Conservation (ANICO)		All around the park	12 sectors borderin g the park (2 in each sector)				

A summary of the animal raid deterrents around Virunga NP, DR Congo

Intervention	***Target animal***	***Site selection criteria***	***Dimensions of the intervention***	***Observation***	***Strengths***	***Challenges***	***Cost/Source of funding***
Stone wall	Buffalo	Along the park the Mikeno sector that is most affected by buffaloes	Length of wall 52km. It is 1.5m high and 1m width	Wall is in bad shape along most of the 52km especially on Eastern part neighboring Uganda	Considerable success in reducing buffalo raids and also reduced on encroachment during its first 2 years.	Regular maintenance and repairs still a big problem. Animals have broken down the weak sections	USD 4/m for 0.5km USD 2.5/m for upgrade of 10km stretch Funded by IGCP in 2009/2010 (Kalpers et al.2010)
HUGO	Gorilla, buffaloes, Elephants	Areas prone to crop raiding in the Mikeno sector(Jomba, Bikenge	40 Members	ICCN has currently taken on HUGO to help with Patrols and removal of snares			IGCP funded their training, Equipment and helped them start income generating

		and Bukima)		because of their experience			projects
Scare shooting	Buffaloes Elephants	Directed at places where buffaloes cross from the most	ICCN rangers.		Quite effective in chasing back Elephants	Elephants are getting used to the sound bullets because of the war	Costs incurred by ICCN
Electric fence	Buffaloes, Elephants	Covering the northern part of Mikeno. When finished will cover the whole of Mikeno sector	Covers 15km. 2km not fenced	ICCN working with the local communities to set up the fence	Reduced incidences of Human-Wildlife Conflict around the park	Human-Wildlife Conflict diverted to the unfenced part of the park Maintenance costs are high and sometimes the solar energy is unreliable	Funded by ICCN and central government

A summary of the animal raid deterrents around Semuliki NP, Uganda

Intervention	***Target animal***	***Site selection criteria***	***Dimensions of the intervention***	***Observation***	***Strengths***	***Challenges***	***Cost/Source of funding***
Live fencing with Mauritius thorn	Buffaloes	Being piloted in areas most prone to raids	4km length	Started in 2008		Expensive to maintain, likely to be invasive if not managed well, do not grow well in water logged areas	UWA
Guarding	Buffaloes, Baboons	Gardens likely to be raided	Variable according to season and crop				Individual farmers
Scare shooting	Elephants, Buffaloes	Whenever raids occur				Only a stop-gap measure, animals getting habituated to gun shots, late reporting by local communities, locating raiding animals at night	UWA
Hunting	Baboon	Whenever	52 vermin	Supposed		Hunters kill	Local

	s, Bush pigs	groups are sighted	control groups covering approximately 13km length	to be implemented by local governments		indiscriminately (supposed to kill dominant males in case of baboons), sometimes eat the animals they have killed rising risk of disease transmission like Ebola	community volunteers

A summary of the problem animal interventions around Rwenzori Mountains NP, Uganda

Intervention	***Target animal***	***Site selection criteria***	***Dimensions of the intervention***	***Observation***	***Strengths***	***Challenges***	***Cost/Source of funding***
Mauritius thorn	Bush pigs, Baboons, Monkeys, Chimpanzees	Areas chosen by community with help of CC Departmnt	15.6km of the park boundaries have been planted	The hedge is doing well in Kilembe and Kazingo and more people are	Has been very effective. Land in Kilembe and Kizingo that was not cultivated is now being used and less	Proper and regular maintenance and management is the greatest Rocky and water logged areas cannot support the hedge	During the initial planting people were paid UGX 2000 (US$0.8) for lunch. They were also given

				involved in planting and maintenance. In most areas maintenance is still a problem. The boundary management groups have taken on the responsibility of the hedge as well.	complaints coming from Kazingo. School attendance has improved as children no longer have to stay home to guard family gardens		free gloves, hoes and pangas Funding was mainly from WWF (RMCEP 1), UWA and revenue sharing.
Guarding	Bush pigs, Baboon	Individuals choose vantage	The number of guards	Communities trust this	Success largely depends on	Major reason of children school drop out	Costs incurred are mainly

	s, Monkeys, Chimpanzees Porcupines	points on their land where they have a view of all the surrounding area and also base on past experiences and intensity of raiding at that particular time	depend on how big the garden is. Normally children and women do guarding. An acre can be guarded properly by two children above age 6	intervention more than the introduced methods	the more time someone spends by their gardens. Most communities believe it the best intervention against primates and other animals that raid in the day	Ties down people who cannot get involved in other income generating activities	the food people carry to garden 'lunch.' Commercial farmers pay other individuals to do the guarding. For the short season (Beans) about UGX100,000 (US$40)
Hunting with rangers and dogs	Bush pigs, Baboons, Vervet Monkeys	Based on reports from communities on presence of vermin in the	Number of farmers depends on how many are willing volunteer	Strictly done under the guidance of Rangers. People may	Relatively successful with baboons and bush pigs.	Threat for indiscriminate killing of wildlife when communities are angry	No potential costs involved

		villages	with one or two rangers	confuse the primates			

A summary of the problem animal interventions around Mgahinga Gorilla NP, Uganda

Intervention	***Target animal***	***Site selection criteria***	***Dimensions of the intervention***	***Observation***	***Strengths***	***Challenges***	***Cost/Source of funding***
Stone wall	Buffalo, Porcupines Bush bucks	Along the park boundary with the three affected parishes. Done agreement with communities and UWA	Length of wall is 12.7km currently. It is 1.5m high and 1m width	Buffalo wall committees were formed to take responsibility of the wall under supervision of UWA. Erythrina abbyssinica and Solanum species	Considerable success in reducing buffalo raids. Cases of buffalo raids reduced from 118 in 2010 to 37 in 2011. For the porcupines and bush bucks the reduction in crop raiding has been	Pressure has been transferred to the 6 Km stretch where there is no wall. People break down the wall to access the park illegally and also to graze cattle. There are several weak points buffaloes throw down regularly Inconsistency and poor maintenance of the wall	UGX 1500 (US$0.6) per person per 1m by 1m. During the initial set up of wall in 1994. UWA in has a budget of about UGX200,000 to 300,000 (US$80 to 120) a

				used to reinforce weak sections of the wall.	quite impressive		month for maintenance In general funding has come from CARE DTC (1994),Prime West(2003),Gorilla organization (2008,2010 and 2011),IGCP (2009) and revenue sharing funds
Scare shooting	Buffaloes Elephants	Directed at places where buffaloes cross from	UWA rangers. Their number depends	Requires good collaboration between	Quite effective in chasing back Buffaloes that have	Communities are reluctant to report the presence of buffaloes in the	All costs are incurred by UWA with exception

		the most	on how many buffaloes are have come out	UWA and communities	already crossed	villages because they want to carry out revenge killings or to eat them	of the mobile phone airtime communities use to call UWA
Guarding	Buffaloes Porcupines Bush backs	Done at sites with no wall or weak spots along the wall.	Each family commits a individuals along its gardens	Is more effective when communities join hands to do it together		Risk of people getting hurt by buffaloes while guarding because they try to kill and eat them	All families pay for their expenses. Most of it is spent on food

ANNEX 4

MEMORANDUM OF UNDERSTANDING

Between

THE GREATER VIRUNGA TRANSBOUNDARY COLLABORATION SECRETARIAT (GVTCS)

AND

INSTITUTE OF TROPICAL FOREST CONSERVATION (ITFC)

This Memorandum of Understanding ("**MOU**") is made on this 4th day of October, 2012;

Between

The **Greater Virunga Transboundary Collaboration Secretariat**, which is the institution responsible for managing Greater Virunga Transboundary Collaboration and is located at Building ADRA, Nyarutarama, Opposite the Ministry of Youth and ICT, P.O. Box 6626, Kigali RWANDA, herein after referred to as **GVTCS**,

and

The Institute of Tropical Forest Conservation (ITFC), Mbarara University of Science and Technology, P.O. Box 44, Kabale, Uganda, located at Ruhija, Bwindi Impenetrable National Park.

(each a "Party" and together the "Parties")

Preamble

The three Protected Area Authorities (PAAs) namely: Institut Congolais pour la Conservation de la Nature (ICCN) of Democratic Republic of Congo, Rwanda Development Board (RDB) and Uganda Wildlife Authority (UWA), together with key partners established a Greater Virunga Transboundary Collaboration (GVTC) to coordinate the transboundary conservation activities of the Greater Virunga Landscape. The roles of the Secretariat include:

- To ensure a harmonised approach to wildlife conservation in the Transboundary (TB) Protected Areas (PAs) network
- Develop strategies for Transboundary Natural Resource Management (TBNRM) including ensuring the required high level political support
- Planning, monitoring and evaluation of transboundary projects

- Securing stable and sustainable financing for biodiversity conservation and management of the PA Network.

Within the framework of implementing the 10-year Transboundary Strategic Plan, the Greater Virunga Transboundary Collaboration Secretariat (GVTCS) secured a one-year funding from the Ministry of Foreign Affairs of the Royal Norwegian Government to implement some elements of this strategic plan. One of the specific requirements is to support interventions on human-wildlife conflicts in the landscape.

On the other hand the ITFC is a very well known research institute of Mbarara University of Science and Technology located inside Bwindi Impenetrable National Park in South West Uganda. Established in 1991, it has a long experience working with local community for sustainable solutions in human-wildlife conflicts in Uganda and has been involved in human-wildlife conflict management and research within the Albertine Rift.

CONSIDERING that GVTCS has mandated its Core Secretariat to implement the one-year project;

WHEREAS, the Greater Virunga Transboundary Collaboration Secretariat, has a mission to strengthen Transboundary Collaboration for the conservation and sustainable development across the Central Albertine landscape;

CONSIDERING that ITFC in its independent capacity as an organisation set up to implement biological and socio-economic research and monitoring aimed at addressing the challenge for conservation in the region with focus on community, park and wildlife interactions. ITFC has already undertaken some studies related to human wildlife conflict management in Uganda;

AWARE that GVTCS and ITFC will achieve their objectives by working together in determining the extent of human wildlife conflict and suggest recommendations for effective management of the conflict in the Greater Virunga landscape.

Now, therefore, the Parties now hereby agree to the following terms and conditions:

I. Objectives

The objective of this MoU is to prepare a review of the extent of human-wildlife conflict and the different interventions being undertaken to curb the impact of the conflict on the community in the GVL. The review will provide a a basis for identifying cost effective action plans for human-wildlife conflict interventions in the landscape for implementation in the future. The MoU is developed based on the concept developed by ITFC and agreed on with GVTCS (included as Attachment A)

and as further described in this MOU. The Parties may engage from time to time in additional activities in furtherance of the Transboundary Strategic Plan, and specifically human wildlife conflict mitigation measures, as mutually agreed on terms and conditions which shall be formalized in writing and incorporated as an addendum to this MoU.

The specific objectives shall include:

i. Review the human-wildlife conflict situation in the GVL;
ii. Assess the national and local policies on human-wildlife conflict;
iii. Identify the key stakeholders and their roles in human-wildlife conflict management;
iv. Evaluate the human-wildlife conflict management strategies; and
v. Appraise the successes, challenges, and lessons learned in initiating and implementing human-wildlife conflict management strategies

II. Key activities:

Human wildlife conflicts have been one of the biggest conservation challenges in general but particularly in the Great Virunga Landscape (GVL). The presence of a rich variety of biodiversity surrounded by high human population settlements is a recipe for clear cut conflicts between humans and wildlife (WCS, 2009). Many efforts and interventions have been tried to mitigate the impacts of the conflict. Unfortunately, information on human-wildlife conflict management experiences is scattered and not coordinated. It becomes therefore difficult to know what has done, where and the successes, failures and lessons learned on human-wildlife conflict to be duplicated or avoided in similar situation. ITFC will take lead in activities that will help determine the extent and measures that have been undertaken and give recommendations on the appropriate ones under different circumstances and conditions. ITFC will specifically undertake the following activities:

i. Reviewing published scientific literature, reports on human wildlife conflict from key stakeholders included but not limited to protected area authorities, NGOs and local authorities involved/or/and affected by human wildlife conflict.
ii. Consulting and discussing with the present and former protected area staff and conservation organization field staff, selected local community leaders/representatives and individual researchers on human – wildlife conflicts and interventions undertaken to address the challenge. Site visits

to selected areas where human-conflict control methods have been tried will also be undertaken.

iii. Document the extent of the human wildlife conflict in the region, strategies so far tried and their successes and failures.

iv. Provide a summary of the different interventions (and their combinations) and the areas they are most effective in addressing human – wildlife conflicts.

III. Key deliverables:

The deliverables shall include:

1. Inception report – showing interpretation of the terms of reference and the format of the report and data collection tools and methods
2. Draft report – spiral bound and soft copy showing responses to objectives and specific aspects in the terms of reference
3. Share the findings to the main stakeholders in the GVL
4. Final report – 5 copies perfect bound and soft copy showing responses to objectives and specific aspects in the terms of reference

IV. Funding:

A total amount of USD 11,519 (**eleven thousand five hundred and nineteen**) is allocated by GVTC for this activity as indicated in the concept submitted by ITFC. This sum excludes taxes which will be covered by GVTC as necessary.

GVTC will provide an initial USD 8,000 (eight thousand) at signing of this MoU and then make a final payment at submission of the final report and relevant accountability of the use of the funds.

V. The timeframe:

This project shall run from October 2012 and November 2012. Any change in completion dates shall be requested at least two weeks before the stated completion date with clear verifiable reasons for the request. A decision on the extension will be mutually agreed on.

Any significant changes (both actual and foreseen) in the project work plan and implementation strategy shall clearly be stated in the project reports and approved by the GVTCS before the next disbursement is approved.

VI. Information Sharing and Use of Intellectual Property:

GVTCS and ITFC hereby agree to exchange information on their mutual projects in the area and the results of any studies relevant to the achievement of sustainable natural resource management in the landscape.

VII. Miscellaneous and Reporting:

Except as otherwise specified in this MOU, notices, correspondences hereunder shall be addressed to:

The Greater Virunga Transboundary Collaboration-Secretariat Building ADRA, Nyarutarama, P.O Box 6626, Kigali Rwanda.

And

The Institute of Tropical Forest Conservation (ITFC), Mbarara University of Science and Technology, P.O. Box 44, Kabale, Uganda.

ITFC shall submit two technical and financial reports, one at submission of the draft report and the second at the end of the assignment (at submission of the final report).

VIII. Relationship:

Nothing in this MOU shall be construed to create a relationship between the Parties of agency, partnership, joint venture or any other similar arrangement, or to render either party liable for any debts or obligations incurred by the other.

This memorandum shall be in effect from the date when it is signed by the two parties. This memorandum of understanding will be extended or amended upon written request of either of the parties herein and the subsequent written approval or concurrence of the other parties. The written consent envisaged in this clause herein shall not be unreasonably withheld if it is intended to be for the benefit of the objectives of this memorandum of understanding

IX. Conflict Resolution:

The Parties hereby agree that, in the event of any dispute between the Parties relating to this MOU, the Parties shall first seek to resolve the dispute through informal discussions. In the event any dispute cannot be resolved informally within thirty (30) days, the Parties agree that the dispute will be negotiated between the Parties through mediation. The Parties shall share the costs of mediation equally. Neither party waives its legal rights to adjudicate this MOU in a legal forum.

X. Termination:

Either party will have the right to terminate this MOU by giving 14 (fourteen) consecutive days written notice to the other party of its intent to terminate. Upon receipt of the termination notice from a party, the other party will take all action necessary to cancel outstanding commitments relating to the work under this MOU. It is understood that the parties will use their best efforts to honour their respective prior commitments.

XI. Indemnity:

Each party agrees to indemnify, and defend and hold the other party, its trustees, directors, officers, employees, independent contractors and agents (together, the

"Indemnities") harmless from and against any and all claims, causes of action, liabilities, damages, injuries, claims, suits, judgments, and expenses (including reasonable attorneys' fees, court costs and out-of pocket expenses) suffered or incurred by any Indemnity as a result of (a) any act or omission of the indemnifying party or any of its employees, independent contractors or agents which is negligent or wilful misconduct, (b) breaches of any provision of this MOU, or (c) any third party claims of infringement of proprietary rights.

XII. Amendments:

No amendment of this MOU is valid unless in writing and signed by both Parties.

XIII. Entire MOU:

This MOU as well as any Addendum approved in writing, each of which is incorporated in the MOU, constitute the entire MOU and understanding between the Parties and supersede any prior or contemporaneous oral or written understanding or MOUs between the Parties related to the matters addressed herein.

XIV. APPROVAL:

The undersigned approve this Memorandum of Understanding to review the extent of human wildlife conflict and its mitigations strategies in the Greater Virunga Landscape.

SIGNED and **SEALED** for and on behalf of **The Greater Virunga Transboundary Collaboration Secretariat**

By:

Signature:---------- Date:----------

Name: Samuel John MWANDHA

Position: **GVTCS- Executive Secretary**

In the presence of:

Signature:----------Date:----------

Name: Therese MUSABE

Position: **GVTCS Deputy Executive Secretary**

SIGNED and **SEALED** for and on behalf of **Institute of Tropical Forest Conservation ITFC**

By

Signature:----------Date:----------

Name: Robert BITARIHO

Position: Acting Director of ITFC,

In the presence of:

Signature: ----------Date:----------

Name: Desiderius TIBAMANYA
Position: Finance and Administration Officer-ITFC

ANNEX 5

GREATER VIRUNGA TRANSBOUNDARY COLLABORATION

N11641 ADRA building Nyarutarama Road, P.O. Box 6626 Kigali Rwanda; e-mail: info@greatervirunga.org

October 18, 2012

Dear Partners and Stakeholders
Greater Virunga Landscape,

INTRODUCING THE INSTITUTE OF TROPICAL FOREST CONSERVATION

The Greater Virunga Transboundary Collaboration (GVTC) is a mechanism for strategic, transboundary, collaborative management of the Greater Virunga landscape. Born from informal transboundary activities among protected area staff, GVTC has strong political commitment from the three countries of the Democratic Republic of Congo, Rwanda and Uganda. The GVTC's goal is the improved conservation of species, habitats, and ecological services contributing to increased socio-economic benefits, through effective transboundary collaboration.

GVTC has contracted the Institute of Tropical Forest Conservation (ITFC), a research institute affiliated to Mbarara University, Uganda, to compile the lessons learned over the years by the different partners in the Greater Virunga Landscape (Central Albertine Rift) as they implemented various human-wildlife conflict interventions. These lessons will then be used by all partners in the landscape to better plan for further interventions to reduce the conflicts being observed. A team composed of Robert Bitariho, Dennis Babaasa and Emmanuel Akampurila will be undertaking the compilation.

This letter serves to introduce the consultants, ITFC, to you and request that you provide them with information related to human-wildlife conflict interventions you have been involved in and the lessons that can be drawn from them. The team will be contacting you directly as they carry out this activity. Kindly accord them to support they need to conclude this assignment well and in time.

We appreciate your partnership and support.

Yours Sincerely

Sam Mwandha
Executive Secretary